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Editor's Note

Clarke, Cognition, and the Presidential Campaign

This issue's tributes to Arthur C. Clarke stand as soaring testaments to that seminal figure of the twentieth century. Here, a side note: His "Clarke's Law" is often recounted, "When a distinguished but elderly scientist states that something is possible, he is almost certainly right. But when he states that something is impossible, he is almost certainly wrong." But let us not forget Asimov's Corollary, propounded by Clarke's friend and peer, Isaac Asimov (SI, Spring 1979). It also, especially to longtime readers of SI, has the ring of truth: "When, however, the lay public rallies 'round an idea that is denounced by distinguished but elderly scientists and supports that idea with great fervor and emotion—the distinguished but elderly scientists are then, after all, probably right."

* * *

Anomalous cognition seems to be the new euphemism for ESP. Proponents of extrasensory perception and precognition are constantly searching for academic respectability. So they recently held an invitation-only conference on "anomalous cognition." Amir Raz, a young neuroscientist and skeptic—"of the deferentially inquisitive rather than gravely unyielding variety"—was there, as was our own Ray Hyman, a psychologist who has spent much of his life critiquing psi claims and trying to understand the dynamics of belief. Their two reports on this issue provide refreshingly complementary perspectives on why that craved-for respectability is yet to come.

* * *

The Science Debate didn't happen. At least not the one in April the three presidential candidates were invited to (SI, March/April 2008). A coalition of scientists and science communicators started the campaign (see www.ScienceDebate2008.com). Paul Kurtz and I were among the first forty signers. By early spring, all the nation's scientific leaders, including dozens of Nobel laureates, and virtually every major scientific organization in the country, including the National Academy of Sciences and the American Association for the Advancement of Science, had signed the invitation petition. At last count 37,500 individuals had signed. Prominent scientists continued urging the forum. The word "debate" was dropped; it could be a "conversation." Three other dates and locations were proposed. The candidates were assured it would deal with policy and not be a science quiz. Only the McCain campaign gave the courtesy of a formal response, a polite decline.

Is the candidates' lack of response a troubling measure of how science has faded in the national consciousness? It is hard to believe otherwise. Hillary Clinton and Barack Obama took part instead in a "Compassion Forum," a clear signal that Democrats aren't letting Republicans run away with the "values" and "religion" issue, as in the past. But what about science and technology, which drives economic change and creates new social and political questions? Some high-level recognition of the revolutionary power of new research and public discussion of these issues would be reassuring. Would the candidates support good science and reject bad science and ideology in policy making? In education? We can only guess. Perhaps science will get an airing in the general election.

—KENDRICK FRAZIER

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The Spate of Bogus Research Papers from Korean Scientists

FRANK REISER

Fame came rapidly to Kim Tae-Kook (sometimes written as Tae-Kook Kim) after he claimed to have discovered a molecule, named CGK733, capable of genetically reprogramming a cell's lifespan. For this breakthrough in anti-aging research, published in Nature Chemical Biology in 2006, he was heralded by the press as Korea's rising intellectual star. When Kim was interviewed by Agence France-Presse (AFP), he boastfully proclaimed, "For the first time in the world, our team has discovered the substance that could slow the ageing [sic] of human cells and at the same time cause a reverse reaction."

"Kim Tae-Kook is the Korean candidate most likely to win the Nobel Prize!" proclaimed Suh Nam Pyo, president of the state-run Korea Advanced Institute of Science and Technology (KAIST), where Kim and his team carried out their research. South Korea's then-president, Roh Moo-Hyun, invited Kim to the Blue House—Korea's presidential offices—to honor his accomplishment for Korea.

Eureka moments in biology are rare. Teasing demonstrable facts from the complexity of life can be an arduous process of reworking, testing, and finally expanding the principles previously discovered by others. Isaac Newton modestly phrased the process in a letter to Robert Hook: "If I have seen a little further it is by standing on the shoulders of giants." It was the same with Kim, whose anti-aging discoveries were only made possible by using a scientific advancement published in Science a year earlier. The earlier paper detailed a technique for moving molecules inside a living cell by using protein-coated magnetic nanoparticles. Kim Tae-Kook, the paper's lead author, christened this process with the catchy acronym,

Professor Kim Tae-Kook. Photo credit: STR/AFP/Getty Images

Editorial Expression of Concern

IN THE 1 JULY 2005 ISSUE, *SCIENCE* PUBLISHED THE REPORT "A MAGNETIC NANOPROBE TECHnology for detecting molecular interactions in live cells" by J. Won *et al.* (*1*). Professor Gyun Min Lee, Chair, The Internal Investigation Committee, Department of Biological Science, Korea Advanced Institute of Science and Technology (KAIST), notified *Science* on 28 February 2008 that this article, published by Professor Tae-Kook Kim and his co-workers, is being investigated along with a paper published in *Nature Chemical Biology* (*2*). The correspondence from Professor Lee states that, although the formal investigation has not yet been completed, "our initial investigative results are strong enough to convince us that the two papers do not contain any scientific truth."

Science is publishing this Editorial Expression of Concern to alert our readers to the fact that serious questions have been raised about the validity of the findings in the Won *et al.* paper. We are working with the authors and KAIST to determine appropriate next steps.

DONALD KENNEDY[1] AND BRUCE ALBERTS[2]

[1]Editor Emeritus; [2]Editor-in-Chief

References

1. J. Won *et al.*, *Science* **309**, 121 (2005).
2. J. Won *et al.*, *Nat. Chem. Biol.* **2**, 369 (2006).

Science magazine published this forthright "Editorial Expression of Concern" about the Kim Tae-Kook Science paper (Won et al. 2005) in its March 7, 2008, issue. This alert that "serious questions have been raised about the validity of findings" in the paper is signed by Editor Emeritus Donald Kennedy and Editor-in-Chief Bruce Alberts.

MAGIC (MAGnetism-based Interaction Capture). Using MAGIC, Kim then discovered the anti-aging molecule CGK733, which he named after his own biotechnology venture company, CGK. For Kim, the giant upon whose shoulders he stood to see further happened to be his own.

Early in 2008, Yi Yong-Weon, a PhD student in Kim's lab and co-author of both papers, reported to KAIST administrators that during Kim's absence from the lab he could not replicate the results claimed in either of the papers. KAIST's president confronted Kim with the allegation that his results were irreproducible and asked him to produce his research notes. Kim said he could not do that and soon admitted to fabricating the data.

This was not the first time Science had to withdraw papers authored by researchers from Korean institutions. In 2006, the journal had to retract a paper it had published after the senior author, Hwang Woo-Suk, admitted to fraud and data fabrication. Hwang, a biomedical researcher at Seoul National University, made headlines internationally with his claims of having cloned several human stem cell lines using enucleated human ova and nuclei taken from epithelial cells. While in the spotlight of the press, Hwang magnanimously offered to freely share his techniques with Western researchers. Shortly after that, Seoul National formed a committee to investigate the veracity of Hwang's claims, questioning the legitimacy of the cell lines; they compared the DNA of the cloned cell lines with that of the donor ova, proving Hwang's claims to be untrue.

A national hero, Hwang's fall from grace was as spectacular as his ascendancy had been. He was relieved of his university position, and the Korean government stopped issuing the Hwang commemorative postage stamp. Hwang wasn't even allowed to keep his one success, Snuppy, the world's first cloned dog. Snuppy was tested and found authentic, but he belonged to the laboratory in which he was created at Seoul National University. Hwang's televised apology for having embarrassed Korea was followed by an outpouring of sympathy from fellow nationals. Hundreds of women left flowers at his lab and offered their ova for use in Hwang's future research projects. To date, 756 women have pledged an ovum to Hwang.

Still another problem with a paper by a Korean scientist came early this year. "Mitochondria, the Missing Link between Body and Soul: Proteomic Prospective Evidence" is not a made-up title.

Eureka moments in biology are rare. Teasing demonstrable facts from the complexity of life can be an arduous process of reworking, testing, and finally expanding the principles previously discovered by others.

Authored by Jin Han and Mohamad Warda, the paper was published in the January 2008 issue of Proteomics, a Wiley-VCH online peer-reviewed journal. Quickly withdrawn after a storm of protesting emails befell the journal's editor, the paper was found to be inconsistent in its logic, with sections plagiarized from other works. Not surprisingly, the paper became an instant hit on a few evangelical Web sites (such as academicfreedomblog.org/2008/02/08/another-darwin-doubter-criminalized/) that proclaimed the paper had been censored for its anti-Darwinian conclusions.

Korea's Ministry of Science published a graph in the Korea Times on June 13, 2007, showing a sharp drop in the number of Korean-authored articles published in prestigious international science journals. The Ministry expressed the concern that because of the recent spate of bogus publications, "Korea was becoming a scientific pariah," going on to describe Korea's plagiarism and fabrication-of-data problem as "deep rooted" and printing a booklet on ethics in research, which it distributed to Korean colleges and laboratories. The Ministry's conclusion was underscored by the high-profile resignation of the president of Korea University for having published six plagiarized research papers and then republishing the same papers under different titles. He also was accused of copying parts of foreign textbooks into three of his own books, to which he replied, "Foreign textbooks are as good as public property" (see english.chosun.com/w21data/html/new/200612/200612270033.html).

Although Kim, Jin, and Hwang were Korean educated, because they earned their PhDs at prestigious universities in the United States, their scientific indiscretions cannot be attributed to academic inbreeding. What, therefore, can be the cause of this spate of unethical scientific behavior?

Richard Dawkins, in his article "Viruses of the Mind" (Free Inquiry, Summer 1993), explains the incredible vulnerability of young minds to "infection" by cultural information packets, termed "memes." By definition, memes are paradigms uncritically accepted as "truth," which are then amalgamated into a person's developing personality. Once installed, they act like a computer virus, contaminating the "infected" individual's clarity of reason throughout adulthood. If the meme concept is accepted, it may partly explain why some highly educated scientists' faith in their own hypotheses could be so unshakable that they would guiltlessly cook the data to make it match their conclusions. Korea's Ministry of Science might better meet its goal of elevating research ethics by investigating Korea's early childhood education than by dis-

Controversy Erupts Over Errors, Bias in Textbook Examined by CFI

In 2006, New Jersey public high school junior Matthew LaClair made headlines after secretly tape-recording the unconstitutional religious messages his history teacher aimed at students. Now a senior, LaClair finds himself making news for exposing misinformation in a nationally distributed textbook.

In the book, American Government: Institutions and Policies, tenth edition (Houghton Mifflin Company, 2006), LaClair found several inaccurate and misleading statements as well as editorializing, inaccuracies about constitutional law, and attempts to sway students to side with the minority of scientists who dismiss global warming.

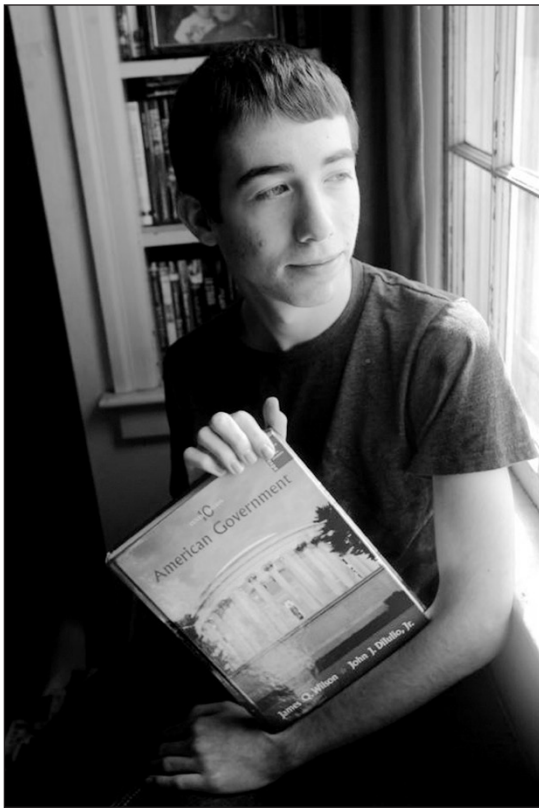
LaClair contacted the Center for Inquiry, and its legal experts analyzed the college-level textbook and released a critical, twenty-five-page report on April 6 detailing "egregious errors." Among the mistakes in the textbook by professors James Wilson and John DiIulio: inferences that the scientific evidence for global warming is unreliable, the fallacy that prayer is illegal in public schools, and the mistaken notion that the religious concept of original sin played a role in the Constitution's design. The book also seems to lament that the document's original, religion-friendly but rejected First Amendment language was preferable to what was actually ratified.

Wilson, a Republican, is the Ronald Reagan Professor of Public Policy at Pepperdine University. DiIulio, identified by Wilson as a Democrat, is the former director of faith-based initiatives for the Bush administration and a professor at the University of Pennsylvania.

In addition to the book's false claim that prayer in any form is banned in schools, a photograph of praying students was captioned, "The Supreme Court will not let this happen inside a public school." In fact, students may pray alone or in groups at any time they like, as long as they don't disrupt the learning environment. What's unconstitutional is compulsory or teacher-led prayer. The book disingenuously portrayed the faith community as public-school martyrs, a known tactic used by the Religious Right to perpetuate unwarranted feelings of victimhood and influence policy makers. Ronald A. Lindsay, CFI's general legal counsel and co-author of the report, noted that the error "betrays either a serious misunderstanding of the law or a willingness to have the textbook serve as a propaganda vehicle for the Religious Right."

The book also labels the scientific majority who see evidence of global warming as entrepreneurial "activists," while placing the mantle of healthy skepticism on those who dismiss it.

CFI, in advocacy mode, sent out a warning stressing that instructional material should be objective and free of ideological bias. An April 8 Associated Press story about the textbook controversy penetrated at least 250 media outlets, including The New York Times, The Chronicle of Higher Education, Fox News, MSNBC, CNN Headline News,



Matthew LaClair

Science, National Public Radio, NPR's Talk of the Nation, The International Herald-Tribune (France), and the U.K. Guardian. Numerous localized stories, high-volume blogging, and media hits in U.S. markets wherever the textbook was used also fueled the controversy's momentum. Even The Weather Channel did a segment on it, citing its skewed view of global-warming evidence.

LaClair was asked to write an op-ed piece for The Los Angeles Times to contrast Wilson's op-ed defense. LaClair's April 27 article recalled the situation as he, CFI, and the AP collectively saw

CFI Public Policy Office Starts Online Blog

The Center for Inquiry's Office of Public Policy (OPP) has launched an online blog to help keep members informed about CFI's legislative activities on Capitol Hill. The OPP blog will include press releases, news updates, and action items to enable readers to learn about and participate in the legislative process.

The blog is located at www.cfidc.wordpress.com and is also located on the CFI/Washington, D.C., Web site at www.centerforinquiry.net/dc. Visit the blog to find out more about how CFI is helping promote and defend science, reason, and secular humanism.

it—that biased and erroneous information had unfortunately circumvented editorial safeguards, and the real tragedy may be that authors are rarely called on it when it happens.

"Of course some textbooks are politically biased," claimed Wilson in his rebuttal, betraying his own bias with some arguably loaded words, deflections, and more layers of deception. Most of the criticisms were unaddressed, and his chief example of resolution was the removal of the prayer photo in the eleventh edition. All would have been well, he posits, if only CFI "had looked at the most recent version of the book (which was in print long before they complained)."

It turns out "in print" means electronic-download-purchase only, and "long before" means published November 30, 2007, copyright 2008. LaClair's original complaint to CFI was exactly one day later, on December 1. Queries to textbook distributors for Wilson's "in print" eleventh edition proved fruitless through the spring, and the Houghton Mifflin Web page still announced as late as April 2008 that the eleventh edition was forthcoming sometime that year. So the e-book was available, for $67.96, but it was certainly not available for perusal in the average classroom, library, or store.

But was it corrected? A copy was purchased April 8, and a side-by-side analysis of sixteen examples shows the offending text wholly unaltered in eleven instances and corrected only for a spelling error in a twelfth (it read, "global warning"). Of the four areas updated, three were rewordings of global-warming entries that held the same basic position as the originals, even adding in one that global warming might benefit mankind by making it easier to "avoid high heating bills." In the fourth, the prayer photo and caption were changed, but the two erroneous mentions of banned prayer in the chapter text were untouched. It appears that all the most recent edition corrects is a typo that was arguably more accurate than the lesson.

Wilson's devotion to fact checking is revealed in his deflection defense of a religious passage, in which he ironically identifies CFI by the wrong name: "The Committee [sic] for Inquiry ignored the book and cherry-picked sentences. We do not think the nation was founded on an idea of original sin." But both editions state, "To the colonists all of mankind suffered from original sin, symbolized by Adam and Eve eating the forbidden fruit in the Garden of Eden. Since no one was born innocent, no one could be trusted with power. Thus the Constitution had to be designed in such a way as to curb the darker side of human nature."

Wilson concludes with a curious call for correspondence: "If anyone who reads this article believes the text is biased, they should write to me," he offers. "If they think it is not biased, they should write the Center for Inquiry."

More information on this, including links to the original articles, side-by-side comparisons of the texts, and Wilson's address for correspondence can be found at www.csicop.org/specialarticles/controversy_bias_in_textbook.html.

—Henry Huber

Henry Huber is the assistant director of communications at the Center for Inquiry/Transnational in Amherst, N.Y.

Court Dismisses Cha Suit, Vindicates Flamm on Questioned Prayer/Fertility Study

A victory for science and freedom of speech has come in a court ruling upholding physician Bruce Flamm's investigations that raised serious questions about a notorious prayer/fertility study.

In 2001, a study published in the Journal of Reproductive Medicine claimed that prayers from the U.S.A., Canada, and Australia caused a 100 percent increase in pregnancy rates among infertility patients in Korea. The surprising results announced by Kwang Cha and associates were widely reported in the news media, including the ABC news program Good Morning America. The following year, the study's credibility was undermined when one of the co-authors, Daniel Wirth, was arrested by the FBI and later pled guilty to fraud (on matters unrelated to the study). Cha's other co-author, Columbia University's Rogerio Lobo, later revealed that he had not participated in the research and withdrew his name from the published findings.

Even with one of his co-authors in federal prison and the other disgraced, Korean fertility specialist Kwang Yul Cha stood by the supernatural study. He eventually filed a defamation lawsuit against Bruce Flamm, a California physician who had published several articles questioning the validity of the Cha/Wirth report.

Flamm wrote a series of reports on his investigations in the Skeptical Inquirer (September/October 2004, March/April 2005, May/June 2007), but the lawsuit was limited to his comments in an opinion piece in ObGyn News. There was never any charge against SI.

The lawsuit, filed in Los Angeles Superior Court in August 2007, was thrown out last November but reinstated in January. The lawsuit has now been definitively dismissed. On April 21, 2008, Judge James Dunn of the Superior Court of California, Los Angeles County, dismissed the case in a two-page ruling. Dunn's ruling said that Flamm's comments were stinging but true, and hence Cha did not have a legitimate basis for a lawsuit. Truth is an absolute defense in a defamation lawsuit.

"This ruling is a victory for science and freedom of speech," says Flamm. "Scientists must be allowed to question bizarre claims and correct errors. Cha's mysterious study was designed and allegedly conducted by a man who turned out to be a criminal with a twenty-year history of fraud. A criminal who steals the identities of dead children to obtain bank loans and passports is not a trustworthy source of research data. Cha could have simply admitted this obvious fact, but instead he hired Beverly Hills lawyers to punish me for voicing my opinions."

Flamm is a partner physician with Kaiser Permanente and a clinical professor of obstetrics and gynecology at the University of California. He has been the senior investigator on numerous medical studies and has written several books and book chapters.

A Physicist's Spirited Defense of String Theory and Science

In an era when the public understanding and appreciation of science continues to fall in reciprocal fashion to the rising influence of science, scientists and science enthusiasts must work ever harder to bring a passion for this craft into the community.

"People who have the ability to communicate about their science to the public have a real responsibility . . . to try to give back an appreciation of what we do," said noted physicist and string theorist Amanda Peet, associate professor of physics at the University of Toronto, the second speaker in the ongoing "Future of Science" series hosted by the Centre for Inquiry/Ontario in Toronto, Canada.

Speaking on "A Gentle Intro to Modern String Theory" on March 28, Peet, an enthusiastic science popularizer, provided clarification of misconceptions about one of science's newest and most powerful conceptualizations of the universe. She addressed challenges by creationists who assert string theory is just another theory without evidence and others who question whether it is but one "theory of everything" among many rivals, as well as concerns about the large price tag on massive physics projects like the Large Hadron Collider (LHC).

Though we may never be able to build a "stringatron" or a "plankatron" in the lab to generate strings or quantum gravity at will, explained Peet, indirectly "we can learn very important things . . . to do with smaller distance scales than we can measure or higher energy scales than we can measure."

String theory does not, at this point, make predictions testable with today's technology, but any comparison to creationism, Peet said, is ridiculous. String theory's structure is logical and consistent, and many scientists believe it generates in its low energy limit the standard model of particle physics. Creationism has absolutely no logical structure at all.

"String theorists don't study string theory because we're religious about string theory—we're scientists, we're physicists—we study it because it's the best idea on the market for explaining what we want to understand," said Peet.

Amanda Peet

While conceding the importance of maintaining a healthy ecology of competing theories, Peet defended the disproportionate number of theoretical physicists working in string theory rather than other avenues of research. "What we're interested in doing is using the best theory we can dream up to explain as much as possible, and that's an optimization problem . . . you just have to be very pragmatic and say 'well, what is the theory that does the best job of explaining the most . . . phenomena that we see already and predicting how to explain new phenomena that we haven't seen already?' . . . and we make a pragmatic choice."

Peet did not apologize for the vision and far-reaching ambitions of the science community. To challenges regarding the cost and prioritization of physics projects over others of seemingly greater direct benefit to society, she remarked that "Physicists are these extremely arrogant creatures who are interested in understanding all the forces and all the subatomic legos that make up the universe." Peet did insist, though, that we bear in mind the diplomatic benefits afforded by the international scope of projects like the LHC on which eighty countries are participating.

She ended on a bittersweet note regarding international relations and political will. "The fact that so many people have all agreed and made peace in the name of particle physics . . . tells you something about how excited we are to be pushing the energy frontiers." It also may highlight how crucial the results and discoveries of the LHC are to the future of science.

"Building an even bigger atom smasher might be just so prohibitively expensive that we can't justify it as a human race," Peet concluded. "We've got a lot of problems on our hands and understanding the fundamental structure of force and matter through all the epochs, from the birth of the universe to now, from the microscopic out to the edges of the universe—that might not turn out to be a big priority."

The success of Peet's presentation, part of the First Anniversary Celebration Series at the Centre for Inquiry/Ontario, highlights the surprising thirst discovered in the community of freethinkers for talks which rather than focusing on religion and science, instead give an appreciation for pure science and its intersection with politics and ethics, as well as science's long-term implication for humanity's place in the universe. At the same time, such events afford the public an opportunity to interact with accomplished scientists and feel a part of the process of discovery.

—Justin Trottier

Justin Trottier is executive director of the Centre for Inquiry/Ontario.

IGNITE THE ADVENTURE

The New Future Fund

"Knowledge is an unending adventure at the edge of uncertainty."

– Jacob Bronowski, scientific polymath

For a more rational tomorrow ... and the future of Skeptical Inquirer ... please support the new phase of the Center for Inquiry New Future Fund

Across our world, forward-thinking men and women have recognized the scientific paradigm as their surest guide for sound thinking and living. For them knowledge is the greatest adventure. Today the Center for Inquiry movement strives to keep the adventure of knowledge accessible to all. To defend science, reason, freedom of inquiry, and human values in an ever-changing world, we must adopt new methods ... new approaches. To realize tomorrow's ambitious goals, we must expand our organization.

The New Future Fund is an audacious, multiyear $26 million campaign to fund program needs, capital expansion, and endowment for the Committee for Skeptical Inquiry (CSI) and the Center for Inquiry.

In this new phase the focus turns to:

- Outreach and education: publishing, media relations, personal outreach, and more
- Influencing public policy through our Center in the nation's capital
- Enhancing the Committee for the Scientific Examination of Religion (CSER)
- The Naturalism Research Project: library expansion, research fellowships, and other initiatives to spur exploration of the naturalist tradition
- Transnational development: reaching beyond borders through the United Nations and direct activism around the globe

As always, the New Future Fund supports new and established programs, including Skeptical Inquirer and CSI's vital media and public education work. Because our work is so important, please make your most generous gift today to support program expansion. By pledging a larger gift over a three- or four-year period, you may find a significant contribution more affordable. Our development staff stands ready to answer questions you may have about asset transfers, planned giving arrangements, and the like. All gifts are fully tax-deductible to the extent allowed by law.

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CSI Committee for Skeptical Inquiry

To promote and defend reason, science, and freedom of inquiry in all areas of human endeavor.
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Toni Van Pelt, Paul Kurtz, and Ron Lindsay (standing); Lawrence Krauss, David Helfland, and Nobel Laureate Paul Boyer (seated) introduced the Declaration in Defense of Science and Secularism at the inaugural press conference of the Center for Inquiry/Office of Public Policy in Washington, D.C.

Local leaders, campus activists, and students from around the world came together at CFI's Summer Session.

Latin American and U.S. skeptical activists met at the CFI-sponsored First Iberoamerican Conference on Critical Thinking in Peru.

The new Naturalism Research Project will more than double our library facilities and create a collegial setting for scholarly dialogue and research.

Stamps of Approval for Four U.S. Scientists; Carl Sagan Next?

In March the U.S. Postal Service issued a new series of American Scientists commemorative stamps. The four first-class postage stamps honor twentieth-century scientists John Bardeen, Gerty Cori, Edwin Hubble, and Linus Pauling. They recognize "four extraordinary individuals who pushed back the frontiers of knowledge," said Postal Service board member James Miller III at the dedication ceremony in New York in which family members of the scientists participated. The descriptions below are taken from the back of each stamp.

Theoretical physicist John Bardeen (1908–1991) shared the Nobel Prize in Physics twice—in 1956, as co-inventor of the transistor and in 1972, for the explanation of superconductivity. The transistor paved the way for all modern electronics, from computers to microchips. Diverse applications of superconductivity currently include infrared sensors and medical imaging systems.

Biochemist Gerty Cori (1896–1957), in collaboration with her husband, Carl, made important discoveries—including a new derivative of glucose—that elucidated the steps of carbohydrate metabolism and contributed to the understanding and treatment of diabetes and other metabolic diseases. In 1947, the couple was awarded a half share of the Nobel Prize in Physiology or Medicine. [Cori's 41-cent stamp was reported by the Associated Press to have a printing error in the chemical formula for glucose-1-phosphate (Cori ester) shown in the background. The stamp is being distributed despite the error.]

Often called a "pioneer of the distant stars," astronomer Edwin Hubble (1889–1953) played a pivotal role in deciphering the vast and complex nature of the universe. His meticulous studies of spiral nebulae proved the existence of galaxies other than our own Milky Way. Had he not died suddenly in 1953, Hubble would have won that year's Nobel Prize in Physics.

A remarkably versatile scientist, structural chemist Linus Pauling (1902–1994) won the 1954 Nobel Prize in Chemistry for determining the nature of the chemical bond linking atoms into molecules. His work on protein structure was critical in establishing the field of molecular biology; his studies of hemoglobin led to the classification of sickle cell anemia as a molecular disease.

Artist Victor Stabin and art director Carl Herrman created a painted portrait plus representations of the work of each scientist. This is the second recent series of American Scientists stamps. In May 2005 the Postal Service issued stamps honoring physicist Richard Feymann, thermodynamicist Josiah Willard Gibbs, geneticist Barbara McClintock, and mathematician John von Neumann (SI, July/August 2005).

There is also a movement afoot to honor Carl Sagan on a U.S. postage stamp. In a statement supporting the idea, Ann Druyan described how Sagan had been an avid stamp collector as a boy, "So this particular tribute to Carl would have held special significance for him, as it does for me." If you would like to support the effort to honor Sagan's lifelong contribution to science, write a short letter of support to: Citizen's Stamp Advisory Committee c/o Stamp Development, U.S. Postal Service, 1735

Paul Kurtz calls Expelled Film 'Anti-Science Propaganda'

Paul Kurtz, founder and chairman of the Committee for Skeptical Inquiry and the Center for Inquiry, has called the anti-evolution film Expelled: No Intelligence Allowed featuring Ben Stein "anti-science propaganda" and an "exercise in anti-intellectualism at its worst."

Said Kurtz: "The social and scientific progress we take for granted has been advanced by a basic scientific and philosophical point of view. As this new film makes abundantly clear, the methods of the sciences and the assumptions upon which they are based are being challenged culturally in the United States with a renewed fervor. Despite its success in providing us with unparalleled benefits, anti-intellectual extremists seek to inhibit free inquiry and misrepresent the tested conclusions of scientific inquiry. This is a highly charged political issue, as science is under political attack. Regrettably, we seem not to have come far culturally since the Scopes 'monkey' trial."

CFI noted that its Committee for Skeptical Inquiry published "a devastating critique" of the film in the May/June 2008 SKEPTICAL INQUIRER ("Expelling All Reason" by Dan Whipple).

CFI, in a statement issued April 23, said it was particularly troubled by the fact that Stein and his producers apparently engaged in a shameless array of dirty tricks and dishonest tactics, many of which were detailed by Scientific American on its Web site. It noted that "Even Fox News has felt compelled to wax critical about the film, saying that the film is 'a sloppy, all-over-the-place, poorly made "expose" of the scientific community . . . showing that Stein, who's carved out a career selling eye drops in commercials and amusing us on sitcoms, is either completely nuts or so avaricious that he's abandoned all good sense to make a buck.'"

Recently, CFI published an extensive position paper authored by Barbara Forrest that convincingly demonstrates that the intelligent design movement is simply a continuation of creationism (www.centerforinquiry.net/uploads/attachments/intelligentdesign.pdf).

—Nathan Bupp

AGU Revises Position on Climate Change

The American Geophysical Union, the world's largest scientific organization of Earth and space scientists (50,000 members), has revised its position statement on climate change. AGU's updated position reflects greater scientific certainty based on mounting evidence and improved scientific understanding of the dynamics of climate change. AGU president Tim Killeen, president of the National Center for Atmospheric Research, said the revision has fewer caveats than previous statements and represents more of a declaration that the climate is changing and that those changes can best be explained as the result of human activity releasing aerosols and greenhouse gases.

The update was affirmed by the AGU Council in December and issued January 24, 2008. Here is the opening paragraph of the 472-word statement:

> The Earth's climate is now clearly out of balance and is warming. Many components of the climate system—including the temperatures of the atmosphere, land and ocean, the extent of sea ice and mountain glaciers, the sea level, the distribution of precipitation, and the length of seasons—are now changing at rates and in patterns that are not natural and are best explained by the increased atmospheric abundances of greenhouse gases and aerosols generated by human activity during the 20th century. Global average surface temperatures increased on average by about 0.6°C over the period 1956–2006. As of 2006, eleven of the previous twelve years were warmer than any others since 1850. The observed rapid retreat of Arctic sea ice is expected to continue and lead to the disappearance of summertime ice within this century. Evidence from most oceans and all continents except Antarctica shows warming attributable to human activities. Recent changes in many physical and biological systems are linked with this regional climate change. A sustained research effort, involving many AGU members and summarized in the 2007 assessments of the Intergovernmental Panel on Climate Change, continues to improve our scientific understanding of the climate.

The statement discusses additional evidence, potential consequences, and how best to respond. The full statement is online at www.agu.org/sci_soc/prrl/2008-03.html. □

Tim Killeen >

Likely Voters Prefer Evolution over Creationism

GREG LADEN

It is common knowledge that most Americans are creationists, and prefer creationist stories of human origins and evolution in general over the findings of evolutionary biology. But this is only true if you ask the questions a certain way, and a new study shows very different results.

This is a new survey of 1,000 likely voters across the U.S. conducted by a coalition of scientific societies[1] and reported in an editorial in the journal of the Federation of the American Societies for Experimental Biology (FASEB Journal 22:1–4, 2008). The survey (reported in full at www.fasebj.org/cgi/content/full/22/1/1) found that most respondents "accepted that life evolved, many accepted that it evolved through natural processes, and more favored teaching evolution than creationism or intelligent design in science classes."

The study addresses the issue of how polling regarding opinions of evolution are asked, noting that there have been variable results in previous polls that could be explained as a function of wording. The present study divided the sample into two halves, providing each with slightly different questions:

> We asked half of the respondents about their views on the evolution of "all living things" and found that 61% accepted that "all living things have evolved over time." Of those, 36% thought all living things "evolved due to natural processes such as natural selection," and 25% thought "a supreme being guided the evolution of living things for the purpose of creating life in the form it exists today." We asked the remaining respondents to consider human evolution and found that 53% accepted that "humans and other living things" evolved. This majority included 32% who accepted that humans and other living things evolved through natural processes and 21% who thought they had evolved with guidance. Compared with other surveys, we found weaker overall support for creationism: 28% and 31% agreed with statements that "all living things" or "humans and other living things," respectively, were created in their present form. Sixteen percent of respondents who were asked about the evolution of "humans and other living things" and 11% of those asked about the evolution of "all living things" did not know or would not disclose their views.

The shift in both attitude and certainly between these two sets of questions is also shown in a graphic from the paper (Figure 1).

Of special interest is the following set of results:

> Thirty-two percent of respondents in our study were unsure about teaching creationism, and 41% were uncertain about teaching intelligent design. By comparison, 22% expressed uncertainty about teaching evolution. Consistent with other studies, however, more respondents favored teaching evolution (53%) than creationism (36%) or intelligent design (27%) in public school science classes. These data show that a majority of people favors—and even more may be open to—teaching evolution in science classes.

The study also examined scientific literacy, though in a somewhat cursory way.

> Although 69% of survey participants had some college education (27% were college graduates, and 14% had attended graduate school), only 23% gave correct responses to all three of

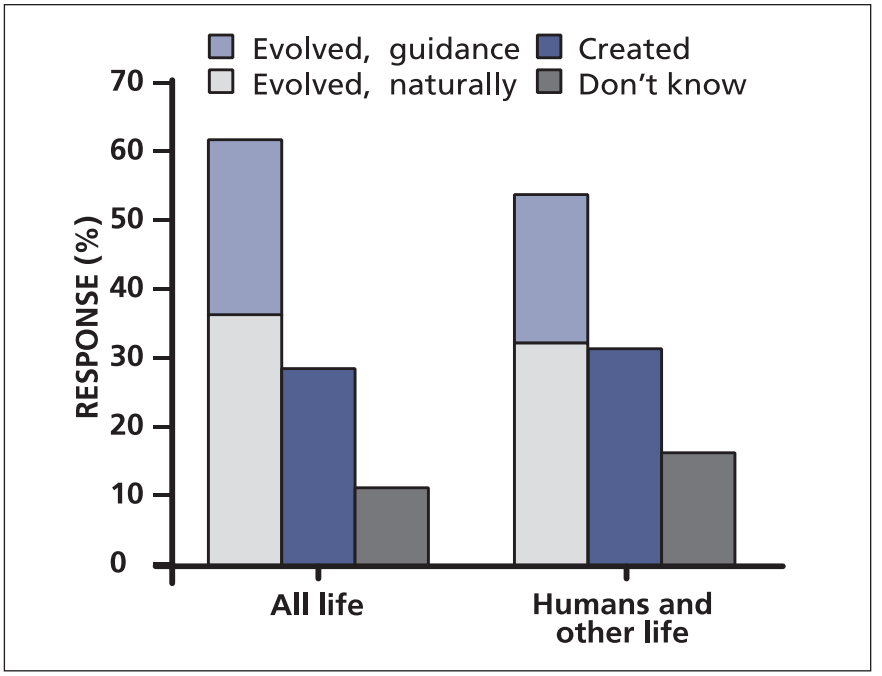

Figure 1. Acceptance of evolution. The percentage of respondents who accepted that "all living things" (left) or "humans and other living things" (right) evolved as a result of natural processes, evolved through guidance by a supreme being, were created in their present form, or who did not know or refused to answer.

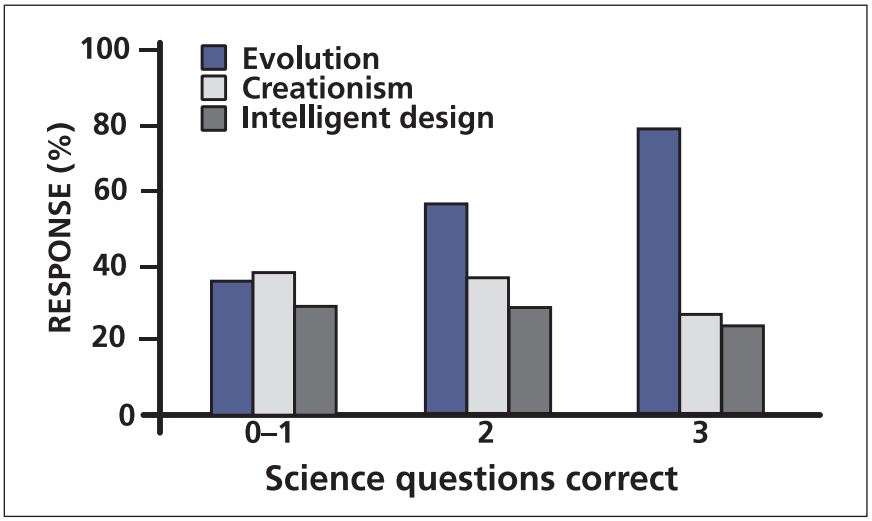

Figure 2. Relationship between scientific literacy and support for teaching evolution. The percentage of respondents who answered zero or one, two, or all three scientific literacy questions correctly who also favored teaching evolution, creationism, or intelligent design in public school science classes.

> the following statements: the continents or land masses on which we live have been moving for millions of years and will continue to move in the future (79% correctly agreed); antibiotics kill viruses as well as bacteria (43% correctly disagreed); the earliest humans lived at the same time as the dinosaurs (53% correctly disagreed).

And, not surprisingly but very importantly, there was a strong link between scientific literacy and attitudes about teaching evolution vs. creationism in schools.

> Respondents who answered all three questions correctly were much more likely to respond that humans and other living things evolved (78%) rather than that they were created in their present form (11%), and more favored teaching evolution (78%) than creationism (27%) or intelligent design (24%). In contrast, respondents who answered fewer than two questions correctly were less likely to accept that life evolved (36%) rather than to believe it was created in its present form (47%), and they were [redacted] lution (36%) as creationism (38%) and intelligent design (29%).

And these results in graphic form are shown in (Figure 2).

Respondents were also asked about the role of science in such critical areas as health, education, and economic competitiveness. Sixty-three percent ranked developments in medicine as the most important type of scientific contribution. Interestingly, this ranking did not vary across those who supported evolution vs. creationism vs. intelligent design in schools.

> People also appear to value the relationship between evolutionary science and medicine. Among a sample of respondents, 61% thought that understanding the contribution that evolution makes to modern medical science, including understanding and treating diseases such as avian influenza, was a convincing reason to teach evolution in science classes. This finding, together with Americans' consistently strong support of medical research, suggests that making the connection between evolutionary biology and advancing other areas of medical research (e.g., understanding human gene function or the mechanisms by which antibiotic resistance develops) might be equally compelling.

In other words, this study provides a recipe for framing evolution.

The survey also provides an interesting window into the attitudes of the general public (of likely voters) toward those involved in research and science education.

Sixty-nine percent of respondents had favorable feelings toward scientists, and even more viewed medical researchers (72%) and doctors (76%) favorably. While fewer people (59%) rated public school science teachers highly, public school teachers in general were the most widely favored group (79%).

When it comes to scientific issues, the scientific community commands the attention of the public. Among respondents presented with a list of people who might explain science to the public, 88% expressed interest in hearing from a scientist, and almost as many were interested in hearing from a science teacher (85%) or a doctor or nurse (84%). On the topics of evolution, creationism, and intelligent design, most respondents expressed interest in hearing from scientists (77%), science teachers (76%), and clergy (62%). Fewer people were interested in hearing from Supreme Court Justices on evolution (37%) or from school board members and celebrities on science (34% and 16%, respectively) and evolution (30% and 11%, respectively). These data indicate that Americans respect the expertise of science and education professionals and also look to clergy for guidance on scientific issues of potential relevance to religion. The value of encouraging each of these groups—including scientists who hold religious beliefs—to become involved in promoting quality science education cannot be overstated.

Note

1. Source: American Association of Physics Teachers, American Astronomical Society, American Chemical Society, American Institute of Biological Sciences, American Institute of Physics, American Physical Society, American Physiological Society, American Society for Investigative Pathology, American Society for Pharmacology and Experimental Therapeutics, American Society of Human Genetics, Biophysical Society, Consortium of Social Science Associations, Geological Society of America, Federation of American Societies for Experimental Biology, National Academy of Sciences, National Science Teachers Association, and Society for Developmental Biology. 2008. Evolution and Its Discontents: A Role for Scientists in Science Education. The FASEB Journal. 2008; 22:1–4. □

Greg Laden is an independent scholar and associate advisor with the Program for Individualized Learning at the University of Minnesota. He has a PhD in archeology and biological anthropology. He blogs at: http://scienceblogs.com/gregladen/ and http://gregladen.com/

When Faith Kills: Christian Healing at the Expense of Rational Medicine

KENNETH W. KRAUSE

I have fought a good fight. I have finished my course. I have kept the faith.

—Dennis and Lorie Nixon's epitaph to their sixteen-year-old daughter, Shannon, on her headstone.

Dennis and Lorie Nixon of Altoona, Pennsylvania, lost two children in the early 1990s. When their younger son, Clayton, fell victim to a common ear infection and pleaded with his parents to make the pain stop, the Nixons chose to address the problem with prayer rather than medical science, in keeping with their Christian faith. Clayton's tiny body eventually succumbed to extreme dehydration and malnutrition. Sadly, he never recovered.

Blair County District Attorney William Haberstroh prosecuted Dennis and Lorie on charges of involuntary manslaughter and child endangerment. After a plea of no contest, the Nixons were sentenced to probation. Asked what he hoped to achieve, Haberstroh answered, "What I want to do is not change their belief, but change their conduct." But—for better or for worse—as people believe, so shall they act.

So maybe it should have come as no surprise that when Clayton's older sister took ill, the Nixon family elected once again to forego secular medicine in favor of prayer and anointment with oil, consistent with scriptural teachings. Shannon's mood improved at one point, so her parents praised God for his perceived

mercy. But the child's condition quickly worsened, and following another round of intense prayer Shannon died at the very end of spring, 1995.

According to the autopsy, Shannon suffered from diabetic ketoacidosis (DKA), which made her blood more acidic than its surrounding tissues. Although the disease is technically incurable, it can be successfully treated scientifically with regular insulin injections typically costing less than one dollar each. Without the shots, medical experts agree, victims of DKA will surely perish. Thus, the Nixons' decision to treat their daughter with prayer alone sealed her regrettable fate. "They sacrificed this little girl for their religious beliefs," Haberstroh concluded after filing a fresh set of criminal charges.

I decided to delve further into the facts of these unfortunate cases when I read about an eerily similar situation in my home state of Wisconsin. By March 26, 2008, the Associated Press had begun to publish reports concerning a little Weston girl—eleven-year-old Madeline Neumann—who had been obviously sick for about thirty days. Instead of seeking medical care, her parents, Leilani and Dale, chose to pray for Madeline's recovery. She died from DKA on March 23, Easter Sunday. The Neumanns were eventually charged with second-degree reckless homicide. But Marathon County District Attorney Jill Falstad decided she could not charge them with child abuse, because section 948 of the Wisconsin statutes provides a criminal exemption for religious parents who choose to treat their afflicted children with nothing but prayer.

The local newspapers referenced a pending case in Oregon as well, where

Kenneth W. Krause is science columnist for the Humanist and books editor for Secular Nation. He has recently contributed to SKEPTICAL INQUIRER, Free Inquiry, Skeptic, Truth Seeker, Freethought Today, Wisconsin Lawyer, and Wisconsin Political Scientist as well. He may be contacted at krausekc@msn.com.

Carl and Raylene Worthington have been charged with manslaughter and criminal mistreatment. Their fifteen-month-old daughter, Ava, became ill with pneumonia and a blood infection, both of which could have been effectively treated with antibiotics. Again, the parents rejected medical science in favor of prayer and again, on March 2, an innocent child died.

I had no idea how frequently these cases occur across America—or how bizarre and horrifying the details can be—until I read about literally hundreds of them in a newly published history of this collective national disaster, When Prayer Fails: Faith Healing, Children, and the Law (Oxford 2008), written by Shawn Francis Peters, professor of history at the University of Wisconsin–Madison. Typical offenders, Peters instructs, are "intensely religious parents whose lives revolve around the doctrines and practices of small, close-knit Christian churches that ground their doctrines in narrowly literal interpretations of the Bible." Young victims live anywhere from California to Massachusetts and, incredibly, their parents are seldom prosecuted, because thirty-nine of our fifty states provide religious exemptions to child abuse or neglect charges, and nineteen states permit religion-based defenses to felony crimes against children.

One might reasonably presume that faith-healing fatalities had long ago become a vestige of our more primitive past given relatively recent and profound scientific advances—the germ theory of disease in particular. But in April of 1998, pediatrician Seth Asser and children's advocate Rita Swan published an alarming study in the highly respected journal Pediatrics that proved otherwise. Asser and Swan investigated 172 child deaths in American faith-healing churches during a twenty-year period and discovered that the vast majority of them had ensued as a result of religion-based neglect. One hundred forty deaths were caused by conditions for which medical science provided a 90 percent survival rate. Another eighteen resulted from diseases in which victims could have expected to endure better than 50 percent of the time.

> "Parents may be free to become martyrs themselves," wrote Justice Wiley Rutledge. "But it does not follow that they are free, in identical circumstances, to make martyrs of their children."

Such incredible stubbornness, of course, could originate from only one source, beginning with the Old Testament. In Exodus 15:22–27, God purportedly advised the Israelites that it is "the Lord who heals you." 2 Chronicles 16 warned that Asa was gravely mistaken in seeking assistance from a physician instead of God. In the New Testament, the author(s) of both Mark and Luke characterized doctors as inept buffoons (somewhat ironically, because Luke was supposedly a physician himself), while the author(s) of John depicted Jesus as a healer of unlimited capacity who could even raise Lazarus from the dead. Those themes reverberate throughout the book of Acts, and, finally, in the Epistle of James, Jesus was said to have prescribed prayer and anointment with oil as the ultimate remedy for all bodily afflictions.

Their forebears having wrested religious authority from the miserly grips of Catholic priests, many contemporary Protestant literalists have similarly attempted to seize medicine from the purview of their more educated and highly trained counterparts. Nineteenth-century Pentecostal healer Carrie Judd Montgomery condemned medical science to the "sin-stricken world," and post-World War II-era evangelist Jack Coe once admonished Christians that any among them who sought care from a doctor would be seared with the "mark of the beast." But most famous of all, perhaps, was Oral Roberts, who claimed that "dozens and dozens" of his followers had been dramatically rescued from the grave during his extravagant, fire-and-brimstone services. In 1987, renowned skeptic James Randi challenged Roberts to produce evidence of the alleged miracles, but Roberts responded with nothing better than a spiteful sermon and a few citations of scripture.

Even so, a handful of modern-day, prayer-healing Christian apologists have attempted in vain to employ the rational methods of science to verify the success of religious involvement generally and religious supplication in particular. Harold Koenig, director of Duke University's Center for Spirituality, Theology, and Health, for example, alleged that churchgoers tended to be healthier than non-churchgoers. Unfortunately, according to Richard P. Sloan, Columbia University professor of behavioral medicine and author of Blind Faith: The Unholy Alliance of Religion and Medicine (St. Martin's 2006), Koenig and others have consistently ignored even the most basic scientific standards, failing to control for obvious "confounders," including the genetic and behavioral traits of their subjects, and refusing to correct for "multiple comparisons," thereby ignoring the statistical distinction between "chance" and "real" findings. Indeed, Sloan sur-

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A Skeleton's Tale: The Origins of Modern Spiritualism

More than half a century after modern spiritualism began with purported communications from the ghost of a murdered peddler, the reality of the messages was allegedly confirmed. A skeleton was reportedly uncovered in the cellar of the original farmhouse where the séances had taken place along with the peddler's tin trunk. Now, a century after that, the claims are again being touted by spiritualists who have enshrined the excavated foundation (figure 1)—sort of a spiritualists' equivalent of the Mormons' Hill Cumorah (where Joseph Smith claimed he received a book written on gold plates from the angel Moroni [Nickell 2004]). Assisted by research librarian Timothy Binga, director of Center for Inquiry Libraries, I sought to uncover the true facts in the case.

Figure 1. CFI Librarian Tim Binga stands at the enshrined site of the birthplace of Spiritualism. (Photo by Joe Nickell)

Background

Modern spiritualism began in Hydesville, New York, in 1848. At the home of a blacksmith named John Fox, strange rapping noises began to occur in the bedroom of Fox's young daughters, Margaret ("Maggie") and Katharine ("Katie"). The girls claimed the noises were communications from the departed spirit of a murdered peddler. After a time, on the night of March 31 (All Fool's Eve!), the girls' mother witnessed a remarkable demonstration that she later described in a signed report.

Loudly, Katie addressed "Mr. Splitfoot," saying "do as I do," and clapping her hands. At once, there came the same number of mysterious raps. Next Maggie exclaimed, "Now do just as I do; count one, two, three, four," clapping her hands accordingly. Four raps came in response (Mulholland 1938, 30–33).

Next, the peddler's spirit began to answer questions by rapping, once for no, twice for yes. He claimed he had been murdered and his body buried in the cellar, but digging there produced only a few bones attributed to animals (Weisberg 2004, 57).

Before long, people discovered that the girls could conjure up not only the ghostly peddler but other obliging spirits as well. The demonstrations received such attention that the girl's older sister, Leah Fish, originated a "spiritualistic" society. "Spiritualism" began to take on the trappings of religion, with hymns being sung at the opening and close of a session (which they called a "séance"). Following a successful visit to New York, Leah took the girls on tour to towns and cities across the nation. Everywhere people were anxious to communicate with the souls of their departed loved ones.

However, scientists and other rational-minded investigators came forth to challenge Maggie and Katie's claims. Early on, University of Buffalo faculty members studied the girls' raps. The examiners excluded "spiritual causation" and asserted, curiously enough, that the raps

Joe Nickell is CSI's Senior Research Fellow. His numerous books include Real-Life X-Files and Adventures in Paranormal Investigation. His Web site is at www.joenickell.com.

were "produced by the action of the will, through voluntary action on the joints." In a much later investigation, the "spirits" gave out erroneous information, and investigators caused the rapping sounds to cease abruptly by controlling Margaret's feet (Mulholland 1938, 34–38).

Then, four decades after spiritualism began, sisters Margaret Fox Kane and Katherine Fox Jencken confessed it had all been a trick. On Sunday, October 21, 1888, the sisters appeared at the Academy of Music in New York City. With Katherine sitting in a box and repeatedly nodding in agreement while a number of spiritualists expressed their disapproval with groans and hisses, Margaret revealed all from the music hall stage. She explained how she had produced the rapping noises by slipping her foot from her shoe and snapping her toes. Placing her stockinged foot on a thin plank, she demonstrated the effect for the audience. As The Evening Post reported the following day, "Mrs. Kane now locates the origin of Modern Spiritualism in her great toe" (qtd. in Christopher 1970, 181). Margaret went on to state:

> I think that it is about time that the truth of this miserable subject "Spiritualism" should be brought out. It is now widespread all over the world, and unless it is put down it will do great evil. I was the first in the field and I have the right to expose it.
>
> My sister Katie and myself were very young children when this horrible deception began. I was eight and just a year and a half older than she. We were very mischievous children and we wanted to terrify our dear mother, who was a very good woman and very easily frightened. At night when we were in bed, we used to tie an apple to a string and move it up and down, causing the apple to bump on the floor, or we would drop the apple on the floor, making a strange noise every time it would rebound. Mother listened to this for a time. She could not understand it and did not suspect us of being capable of a trick because we were so young.
>
> At last she could stand it no longer and she called the neighbors in and told them about it. It was this that set us to discover the means of making the raps.

Margaret explained:

> My sister Katie was the first one to discover that by swishing her fingers she could produce a certain noise with the knuckles and joints, and that the same effect could be made with the toes. Finding we could make raps with our feet—first with one foot and then with both—we practiced until we could do this easily when the room was dark. (qtd. in Mulholland 1938, 41–42)

Margaret also stated that Leah knew the spirit rappings were fake, and that when she traveled with the girls (on their first nationwide tour) it was she who signaled the answers to various questions. (She probably chatted with sitters before the séance to obtain information; when that did not produce the requisite facts, the "spirits" no doubt spoke in vague generalizations that are the mainstay of spiritualistic charlatans.)

Margaret repeated her exposé in other cities close to New York. However, explains John Mulholland (1938, 43), "It was expected that this would give her sufficient income to live but she shortly discovered that while many people will pay to be humbugged few will pay to be educated."

Perhaps not surprisingly, then, Margaret returned to mediumship when she needed money again. After her death on March 8, 1895, thousands of spiritualist mourners attended her funeral.

Today, spiritualists characterize Margaret's exposé as bogus, attributing it to her need for money or the desire for revenge against her rivals or both. However, not only were her admissions fully corroborated by her sister, but she demonstrated to the audience that she could produce the mysterious raps just as she said (Christopher 1970, 181).

The examiners excluded "spiritual causation" and asserted, curiously enough, that the raps were "produced by the action of the will, through voluntary action on the joints."

The Discovery

The Fox sisters had seemingly fooled the world, but, after the turn of the century, new evidence for their supposed genuineness was allegedly discovered. As reported by the Boston Journal of November 23, 1904:

> The skeleton of the man who first caused the rappings heard by the Fox Sisters in 1848 has been found between the walls of the house occupied by the sisters, and clears them from the only shadow of doubt held concerning their sincerity in the discovery of spirit communication.
>
> The Fox sisters declared that they learned to communicate with the spirit of a man, and that he told them he had been murdered and buried in the cellar. Evacuation failed to locate the body and thus give proof positive of their story.

The Journal continued:

> The discovery was made by school children playing in the cellar of the building in Hydesville known as "The Spook House," where the Fox sisters first heard the wonderful rappings. A reputable citizen of Clyde, who owns the house, made an investigation, and found an almost entire human skeleton between the crumbling walls, undoubtedly that of the wandering peddler who it was claimed was murdered in the east room and buried in the basement.
>
> Examination revealed that a false and unobserved inner wall had been built. Between this false inner wall and the original outer wall and near the center of the basement, the skeleton was found. It is interesting to know that the false wall is composed of stones like those used fifty years ago to build stone fences. This recalls a statement made over fifty years ago by Miss Lucretia Pulver, that Mr. Bell [the earlier house owner and presumed murderer] worked each night under cover of darkness, carrying stones from the fence into the cellar. The finding of the bones corroborates the sworn

> statement made by Margaret Fox [the girls' mother], April 11, 1848. . . . (qtd. in Muldoon 1942, 20–24)

Additional stories appeared in other newspapers ("Bones" 1904; "Fox" 1904; "Headless" 1904; "Topics" 1904).

This reputed discovery was trumpeted by spiritualists over the following decades, along with a "tin peddler's pack"—actually a tin trunk (figure 2)—that was allegedly discovered at the same site (Keller 1922, 60). The trunk was later kept in the cottage that had been moved to Lily Dale spiritualist village in 1916 and used as a museum. The cottage remained there until it was destroyed by fire in the 1950s. While the trunk was saved, skeptics have long questioned its authenticity (Weisberg 2004, 266–267).

Investigation

To review the alleged discoveries at the Fox cottage's cellar, I twice visited the site, taking photographs and making a diagrammatic sketch of the stone structure; interviewed knowledgeable persons; examined Fox-related artifacts, including the reputed peddler's trunk at the Lily Dale spiritualist museum; with Tim Binga, conducted research at the Public Library at Newark, N.Y. (where I joked that my work was so important I had "brought my own librarian"); and studied a valuable collection of old papers, clippings, and photographs that were generously sent over to the library for our use by the Newark-Arcadia Historical Society. We also sought out rare books and journals and did much other work, all of it demanding but ultimately paying dividends.

Unfortunately, as it happens, there is reason for skepticism of nearly every aspect of the case. To begin with, the earliest published testimonies never gave the peddler's name, only the initials "C.B.," with the B specifically applying to the surname (Lewis 1848, 10). Only later was the name said to be "Charles B. Rosna" or some variant; Sir Arthur Conan Doyle (1926, I: 64, 76) insisted it was actually "Charles B. Rosma." Another source gives "Charles Rosa" (Guiley 2000, 141).

In fact, no one has been able to find a single record or other proof of the existence of a peddler named Charles B. Rosna/Rosma/Rosa. One source (Pressing N.d., 63) was forced to conclude, lamely, that the name "might have been misspelled," but no peddler with any similar name has ever been identified. We too looked—in vain.

Today, spiritualists characterize Margaret's exposé as bogus, attributing it to her need for money or the desire for revenge against her rivals or both. However, not only were her admissions fully corroborated by her sister, but she demonstrated to the audience that she could produce the mysterious raps just as she said.

Figure 2. Joe Nickell examines the alleged "peddler's trunk" at Lily Dale Museum. (Photo by Diana Harris)

At the old cottage site we studied the restored foundation and its double wall, the "false" interior one having ostensibly been placed secretly to hide the peddler's corpse (Muldoon 1942, 20–21; Keeler 1922). However, it is apparent that the wall in question is actually just one of four inner walls that likely represent an original, boxlike foundation (figure 3). That foundation was apparently later enlarged into a rectangular shape by the addition of new walls around the old ones (creating unequal spaces between the walls at either end and thickening the front and rear walls at the same time). Perhaps the extra foundation resulted from the house having been expanded from a cabin into a cottage. We later discovered that the "two separate stone foundations" were confirmed in 1904 ("Headless" 1904).

As to the bones themselves, their authenticity was questioned at the time of their alleged discovery. The New York Times ("Topics" 1904) reported that the bones had created a stir "amusingly disproportioned to any necessary significance of the discovery." That was because there was no proof either that the bones belonged to the "legendary peddler" or that the Fox sisters had done anything more than capitalize on a then-current rumor that a peddler was murdered at the site. The Times said of spiritualists' claims about the bones, "As usual, they are taking all possible pains to render a real investigation of the affair impossible, and are assuming as true a lot of things much in need of other proof than their own assertions."

The Acadian Weekly ("Fox" 1904) opined that while the bones might have been hidden in the wall for half a century, they might equally have been "dis-

interred from some cemetery and placed there for effect." The paper referred to the original 1848 story of spirit communication at the cottage as "the old hoax."

Eventually, the true source of the bones was reported in an editorial in the Journal of the American Society for Psychical Research in 1909. A physician had been asked by another publication (the Occult Review) to investigate the alleged discovery:

> He reports to us that he found a number of bones there, but that there were only a few ribs with odds and ends of bones and among them a superabundance of some and a deficiency of others. Among them also were some chicken bones. There was nothing about the premises to indicate that they had been buried there, but might have been put there by boys in sport. He also reports that within a few days past he has learned that a certain person near the place had put the bones there as a practical joke and is now too much ashamed of it to confess it. Whether there is any better foundation for these incidents than for the original story it is not possible to decide, but it is certain that the probabilities that there is anything more than a casual coincidence or than a trick played on the credulity of the defenders of the Fox sisters are very much shaded. (Editorial 1909)

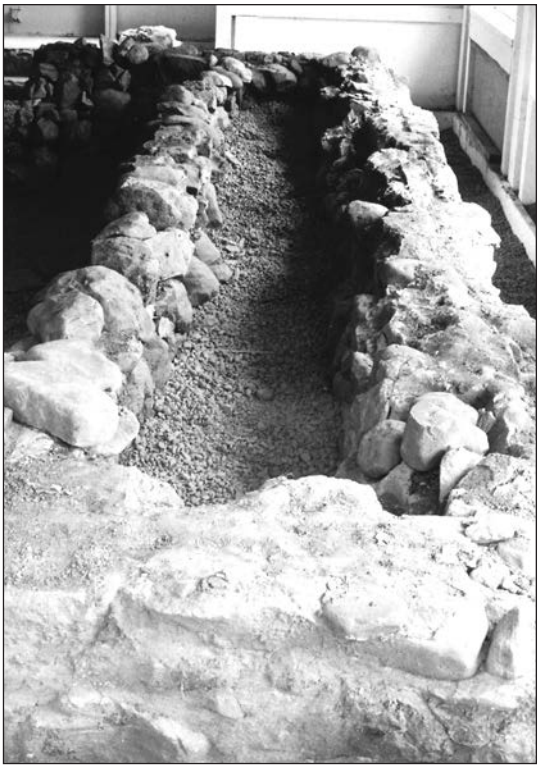

Figure 3. A reputedly false inner wall (left) of Fox cottage is actually only part of a smaller, four-walled, inner foundation. (Photo by Joe Nickell)

But then what about the peddler's trunk, allegedly found at the same site and time as the bones? As a matter of fact, the trunk was never reported in any of the contemporary sources we uncovered. The earliest mention of it I have found is an account penned years later by one P.L.O.A. Keeler (1922), a Lily Dale medium who had a reputation for faking spirit writing and other phenomena (Nickell 2007). I examined the trunk at the Lily Dale museum, whose curator Ron Nagy (2006) conceded there was no real provenance for it nor any proof of its discovery in 1904. And the trunk's condition appears far too good for its supposed half-century burial (figure 2).

Conclusions

The modern unearthing of the Fox cottage's foundations did nothing to support the claim that in 1848 schoolgirls had communicated with the spirit of a murdered peddler. Instead, the excavation made it possible for everyone to see that no "false wall" had been built to hide the legendary peddler's remains but that it was merely part of an earlier, smaller foundation. The best evidence indicates that the 1904 "discovery" of the peddler's bones was a hoax; ditto the later appearance of the tin trunk. Therefore, the Fox sisters' confessions stand, corroborated by independent evidence that the spirit rappings they produced were accomplished by trickery.

The modern unearthing of the Fox cottage's foundations did nothing to support the claim that in 1848 schoolgirls had communicated with the spirit of a murdered peddler.

Acknowledgments

In addition to Tim Binga, I was assisted by many others, including my wife Diana Harris and Paul E. Loynes who did the typesetting. I also wish to thank the helpful staff of the Newark Public Library and the Newark-Arcadia Historical Society (notably John Zornow and Chris Davis), Ron Nagy at Lily Dale and Judge Harold Stiles.

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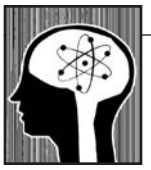

Alternative Science

The scientific method, whatever it is, includes a component that may make some scientists uncomfortable: imagination. Science, after all, is not just a collection of data from which truths about the natural world emerge spontaneously. Theories and hypotheses are the outcome of creative human thinking, and creative thinking requires imagination, not just knowledge. Facts and observations are necessary food for thought, but the food needs to be processed somehow, or there is no science to speak of.

The problem is that we know much less about human creativity and imagination than we do about how to set up experiments and analyze data, which means that we are missing a large chunk of what makes science work. This issue is related to what philosophers of science call the problem of unconceived alternatives: what if there is a conceivable and better theory to explain, say, the process of evolution, but it simply has not occurred to any evolutionary biologist? Scientists may shrug off this sort of speculation, probably muttering something along the lines of "if it's out there, we'll find it." But they would be missing the point: there is, as far as we know, no guarantee that the human mind can think of all possible and relevant theories in any given field, and to believe that the right idea will necessarily pop into someone's mind is very close to an act of faith.

This is the theme of Kyle Stanford's book, Exceeding Our Grasp: Science, History, and the Problem of Unconceived Alternatives, published in 2006 by Oxford University Press (a technical commentary on the book can be found in Biology and Philosophy, volume 23, pp. 135–141, by Patrick Forber). Stanford takes a historical approach to the problem, attempting to show that this isn't just something that philosophers dreamed up to embarrass scientists but a real and recurrent feature of the history of science. For instance, he analyzes early theories of heredity as conceived by Darwin, his cousin Francis Galton (the founder of eugenics), and August Weissman, one of the architects of the modern view of inheritance and evolution. As it turns out, all three scientists were wrong in some fundamental aspect of their theories, but more importantly, it simply did not occur to Darwin to solve his problems by producing Weismann's theory. Perhaps more tellingly, Stanford makes the argument that the data did not, in fact, discriminate between alternative theories at a given time—for instance those of Galton and Darwin—a problem known as the underdetermination of theory by the evidence.

> Theories and hypotheses are the outcome of creative human thinking, and creative thinking requires imagination, not just knowledge.

Why should any of this bother the practicing scientist? After all, don't we now have the right theory of heredity? Perhaps, but how would we know? In fact, despite the spectacular advances in molecular biology over the past several decades, it turns out that the field of inheritance studies is in turmoil again, both because of new discoveries (such as the existence of non-genetic information that gets transmitted from one generation to the next) and new theoretical interpretations (it is no longer clear, for instance, what we actually mean when we use the word gene). Historians and philosophers of science have warned us for years about the fallacy of considering the current state of our knowledge as somehow more definitive than at any other time in the past. After all, one only needs

Massimo Pigliucci is professor of evolutionary biology and philosophy at Stony Brook University in New York, a fellow of the American Association for the Advancement of Science, and author of Denying Evolution: Creationism, Scientism and the Nature of Science. His essays can be found at www.rationally-speaking.org.

to point out that all scientific theories proposed and accepted in the past turned out to be wrong, which is why they were replaced by the theories we currently think are right. But what makes us think that the trend is somehow going to stop?

Stanford's solution to the problem of unconceived alternatives will not be appealing to most scientists (or, for that matter, to a number of philosophers). He calls his suggested alternative "epistemic instrumentalism," a position that says that we can go ahead and use scientific theories to make sense of the world, predict the outcome of experiments, and even build bridges and airplanes, so long as we don't really believe what those theories say about how the world really is. Scientific progress, then, is re-conceived as the production of theories that are better and better as instruments of prediction about and manipulation of the world, but not as a march toward truth.

There is something appealing in Stanford's position in that it forcefully reminds us that science is a human activity and that its pursuers are human beings, with all the epistemic limitations that characterize the species Homo sapiens. After all, we evolved to solve practical problems concerning aspects of the world that affect our survival and reproduction, and we cannot expect any guarantee that our brains will ever be able to produce the final theory that physicists keep thinking is just within their grasp (see Thinking about Science, SI, January/February 2007, on evolutionary epistemology).

And yet, instrumentalists still have to explain why scientific theories seem to work so well as tools and in fact, work better and better over time, at least judging from our ever increasing technological prowess. Some philosophers who consider themselves realists (as opposed to instrumentalists) even think that if science isn't telling us something right about the world as it truly is, then it would be utterly confounding that it can be used as an instrument of prediction at all!

The debate between realists and instrumentalists is not going to be settled any time soon, if ever. But it is a somber reminder of how complex science really is and how little we understand about its inner processes, even when we look at them from the point of view of a seasoned practitioner. This should be no comfort for pseudoscientists though: as physicist Oliver Heaviside once remarked, "Shall I refuse my dinner because I do not fully understand the process of digestion?" □

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mises, what these authors' studies in fact demonstrate is "how weak the evidence actually is."

Somewhat more credible are better-controlled evaluations of long-distance intercessory prayer (IP), where numerous patients are randomly and unwittingly assigned to one or more modes of treatment or control groups. Sometimes subjects are cared for in a variety of ways, as occurred in the MANTRA (Monitoring and Actualization of Noetic Training) and the MANTRA II studies published by Mitchell Krucoff and others in 2001 and 2005. In the pilot program, 150 acute coronary patients undergoing angioplasty were selected to receive one of five treatments: imagery, stress relaxation, touch therapy, IP, or standard care. The results of MANTRA yielded not one statistically significant difference. Nevertheless, Krucoff elected to initiate a larger evaluation. MANTRA II, designed as the definitive study on IP and released in The Lancet, randomized 748 angioplasty or cardiac catheterization patients to one of four treatments: standard care, IP, MIT (a combination of music, guided imagery, and touch), and IP plus MIT. Again, the outcomes confirmed that prayer had no effect.

Finally, in 2006, Harvard's Herbert Benson published the $2.4 million "Study of the Therapeutic Effects of Intercessory Prayer" (STEP) in The American Heart Journal. One might note that such funding originated from the John Templeton Foundation, the stated goal of which is to advance Christian ideology. In any case, 1,802 patients recovering from coronary artery bypass surgery were randomized into one of three groups: those who unknowingly received prayer from three mainstream religious groups, those who unknowingly did not, and those who knew they would receive prayer. Either way, the well-intended prayers had absolutely no effect.

At some level, however, most of us realize that prayer is only valuable, if at all, to individuals who do the praying and only at an unconscious, therapeutic level—particularly during trying and desperate times. In other words, prayer-healing is best understood as a self-administered, psychological (and, in the end, neurobiological) phenomenon. But I also suspect that informed common sense will continue to elude the very limited intellectual horizons of religious literalists who will no doubt always believe that worldly knowledge in contradiction of religious dogma—science, most conspicuously—is the enemy of God and the thief of souls. Which is fine, I suppose, at least for them.

But what about their innocent children; and what, if anything, should we do about the statutory exemptions that expressly invite fundamentalist parents to sacrifice their own kids on the pyre of personal religious conviction? In a 1944 decision, Prince v. Massachusetts, the United States Supreme Court addressed that very question. "Parents may be free to become martyrs themselves," wrote Justice Wiley Rutledge. "But it does not follow that they are free, in identical circumstances, to make martyrs of their children." Along with all rights—including parenthood and freedom of religion—come enforceable responsibilities. At some point, faith must summon the courage of humility, if not of rationality. And, surely, that point is traversed by some considerable distance when a little boy or girl dies for lack of a doctor's pill. □

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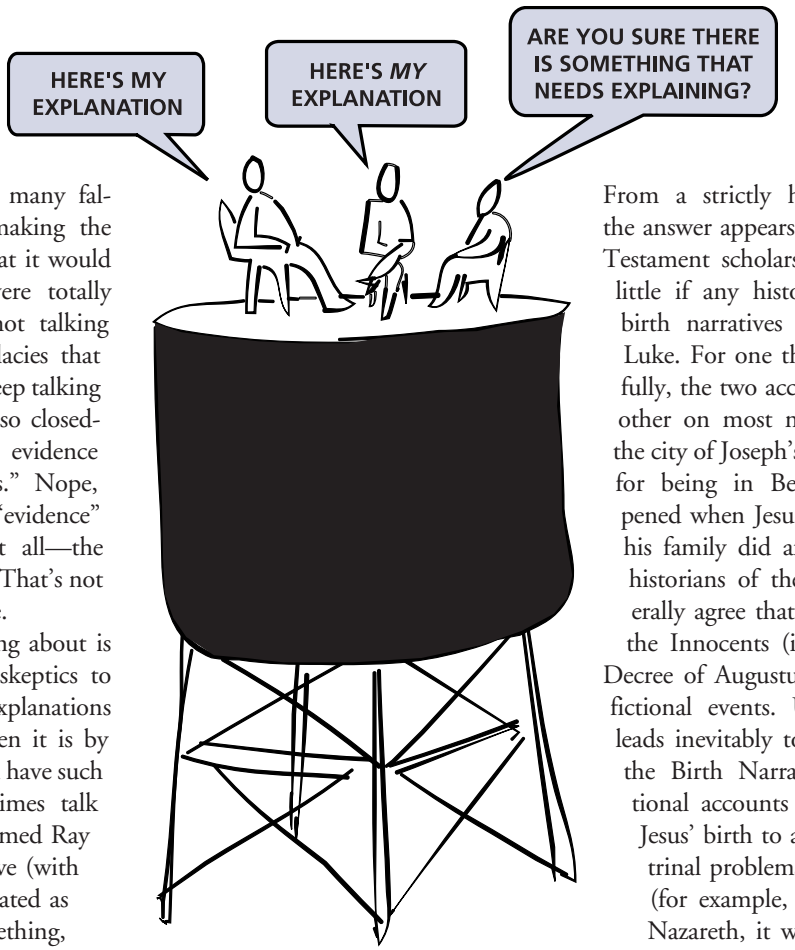
The Fallacy of Misplaced Rationalism



There seem to be so many fallacious arguments making the rounds these days that it would be surprising if skeptics were totally free from them. But I'm not talking about supposed skeptics' fallacies that the paranormal proponents keep talking about, such as "Skeptics are so closed-minded, they ignore all the evidence that doesn't fit their beliefs." Nope, sorry, we ignore so-called "evidence" that isn't really evidence at all—the anecdotal and the unverified. That's not a fallacy; it's just good science.

The fallacy that I'm talking about is the tendency among many skeptics to pursue elaborate, rational explanations for reported phenomena when it is by no means certain that we even have such phenomena. Skeptics sometimes talk of what James Alcock has termed Ray Hyman's Categorical Directive (with apologies to Kant), usually stated as "before we try to explain something, we should be sure it actually happened." Unfortunately, this directive is violated all the time, even by skeptics, and the fruit of its violation is what I term the Fallacy of Misplaced Rationalism: the generation of elaborate, unlikely-but-still-possible explanations for "facts" that may not really be facts.

For example, science-minded folks have spent countless hours trying to answer the question, "What was the Star of Bethlehem?" Perhaps comet so-and-so was visible that year? Perhaps it was a rare conjunction of bright planets, which can be shown to have occurred at a certain time? Or possibly a supernova?

But the proper question to ask is: "Was there really a Star of Bethlehem?" From a strictly historical perspective, the answer appears to be no. Most New Testament scholars accept that there is little if any historical content in the birth narratives in Matthew and in Luke. For one thing, when read carefully, the two accounts contradict each other on most major points, such as the city of Joseph's residence, the reason for being in Bethlehem, what happened when Jesus was born, and what his family did afterward. Professional historians of the ancient world generally agree that Herod's Massacre of the Innocents (in Matthew) and the Decree of Augustus (in Luke) are both fictional events. Unbiased scholarship leads inevitably to the conclusion that the Birth Narratives are largely fictional accounts composed long after Jesus' birth to answer perceived doctrinal problems for the new religion (for example, if Jesus was born in Nazareth, it would pose a problem for the Messianic claim on his behalf, whereas if the story has him born in Bethlehem, that problem vanishes), as well as to create the belief that cosmically important things happened when Jesus was born. This is much more interesting than what almost certainly was the case: Jesus of Nazareth was born in Nazareth, and nothing out of the ordinary happened when he was born. What was the Star of Bethlehem? Most serious New Testament scholars would agree that in all probability, it never existed.

Robert Sheaffer's World Wide Web page for UFOs and other skeptical subjects is at www.debunker.com.

For more examples in the Biblical realm, see the article "Explaining the Plagues of Egypt" by Jeffrey A. Lee (SI, November/December 2004). He reviews many proposed, rational explanations by various scholars for the ten plagues of the book of Exodus. The "red tide" was said to be caused by dinoflagellates; the plague of flies was probably Stomoxys calcitrans, and so on. But as Lee notes, "scholars sometimes hang their conclusions on rather flimsy evidence." Indeed: we have no historical evidence whatsoever that the Israelites were ever in slavery in Egypt in the first place. Therefore, to speculate on the true nature of remarkable events said to accompany the Israelites' alleged escape from slavery is definitely a Fallacy of Misplaced Rationalism. This fallacy is very common in skeptical literature discussing purported miracles in the Bible. Before formulating any unusual-but-possible hypothesis to explain a passage in a religious text, it's wise to research the best scholarship on that text to make sure that the skeptic does not join the religious believer in proposing improbable events to explain a story that is probably fictional.

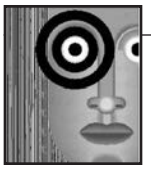
Consider the naturalistic explanations set forth to explain crop circles that were allegedly forming by themselves in fields of grain. The best known of these is the "ion plasma vortex" theory by meteorologist Terrence Meaden of England. According to Meaden, highly ionized air high in the atmosphere creates a vortex of plasma that descends to the surface, creating intense winds in a very small area. Is there any proof that an "ion plasma vortex" exists in our atmosphere? If not, we are trying to explain one unknown phenomena by invoking another. Can an "ion plasma vortex" create one circle inside another, inside yet another like a set of Russian dolls? Do we even have a phenomenon of self-forming crop circles, or do we need any explanation other than nocturnal hoaxers using ropes and boards to create the circles? As a general rule, when a would-be rationalist proposes a previously unknown action of some natural phenomenon to explain some claimed unusual or paranormal phenomenon, it's highly likely that we're seeing the Fallacy of Misplaced Rationalism at work.

When Israeli spoon-bender Uri Geller first achieved fame in the early 1970s by performing supposedly paranormal feats indistinguishable from magicians' tricks, there was an effort in some scientific circles to conjure up explanations of how such apparent miracles could be performed. There was widespread speculation that Geller used a concealed chemical that softened metal, enabling spoons to be easily broken or bent. These theorists apparently never tried to bend a spoon with their hands—it isn't difficult—and once started, simple metal fatigue will do the rest. Since magicians can readily perform the same feat using deception, there is no need to hypothesize anything more complicated. To explain Geller's claimed ability to see inside sealed envelopes, physicist Joseph Hanlon, writing in New Scientist (October 1974), noted that Geller's chief promoter, Andrija Puharich, had patented a radio receiver designed to be hidden in a tooth. The suggestion was that if one looked inside Geller's mouth, one might find such a device. One difficulty with that hypothesis is that some tests took place in rooms utilizing electromagnetic shielding. Ascertaining that it would be possible for such electromagnetic shielding to be breached is not the same as showing how Puharich and Geller could likely have done so without assistance. Before suggesting such a bizarre and complex yet still ultimately rational explanation, it would be more rational to inquire whether there is really any mystery in need of explaining. Did Geller succeed in any such test under sufficiently strict controls that would have precluded a professional magician from cheating? If not (and indeed Geller refused to work when controls became too strict), no additional explanation is needed.

UFOlogy has seen more than its share of misplaced rationalism at work. Perhaps the most obvious example is found in the earliest writings on the subject by the late Philip J. Klass. He began with the idea that many classic UFO photos and sightings might be caused by plasma phenomena arising from electrical lines, an idea underlying his first book on the subject, UFOs Identified (1966). Unfortunately, the glowing plasma balls suggested by Klass were not those occurring in laboratories under extreme, controlled conditions, but supposedly formed out in the open air from the electrical leakage of power lines. Apart from claimed UFO sightings, do we know whether such bright, glowing plasma balls form and persist in our everyday environment? If not, then we are using one unknown phenomena to explain another. Fortunately, as Klass continued studying and investigating UFO claims, he was perceptive enough to realize the enormous role being played by human error, misperception, and hoaxing. He was especially impressed by accounts in which trained flight crews reported a near-collision with an object that turned out to be a bright meteor more than one hundred miles away. Klass was also swayed by a demonstration that the "classic" UFO photos he had once considered solid proof of a plasma phenomenon—the Lucci brothers' two 1965 photos from Beaver County, Pennsylvania—could easily be duplicated using a simple camera trick. He realized that this made any "plasma hypothesis" unnecessary. By the time Klass wrote his second UFO book (in my opinion the best), UFOs Explained (1974), his earlier "plasma hypothesis" was largely forgotten, replaced by a sophisticated understanding of human knavery and error (two phenomena whose existence is extremely well-documented).

UFO skepticism got a black eye when the Air Force released its 1997 report, Roswell—Case Closed, suggesting that those witnesses who claimed to have seen little bodies of space aliens may have actually seen crash dummies dropped in the desert years later to test parachutes. But are there any credible accounts of seeing alien bodies that are not already rendered dubious by other considerations? In other words, are there any facts here requiring an explanation? There might be if the witnesses reported only seeing bodies in the desert and nothing

THE FALLACY OF MISPLACED RATIONALISM
Continued on page 47



SKEPTICAL INQUIREE
BENJAMIN RADFORD

The Mysterious Phoenix Lights

Q: I heard about some strange lights over Phoenix that were sighted recently. I doubt they were aliens, but does anyone know what they were?

J. Griffith

A: Yes, in fact we do. On the evening of April 21, 2008, hundreds of residents in Phoenix, Arizona, called police and local news media to report four (some witnesses said five) bright, red lights hovering silently over the city. They changed position after a while, moving from a triangular to rectangular configuration, then disappeared one by one.

The Air Force claimed they had no aircraft in the area at the time and could shed no light on the mystery. According to FAA spokesman Ian Gregor, "We did receive a number of reports from people who said they saw red lights in the skies on Monday night. Among them were some air traffic controllers [at the Phoenix Deer Valley Airport]. However, there were no unusual targets or unidentified aircraft on our radar scopes. . . . We don't know where the lights came from" (Sunnucks 2008).

Theories abounded, with UFOs and aliens of course being very popular. Was it the beginning of an invasion? Should Earthlings begin searching for the book How to Serve Man?

The lights remained a mystery and became an international media story. The case took a twist two days later when a local television station aired a startling confession by an anonymous hoaxer: he had created the UFO lights using road flares tied to helium balloons, launching them at one-minute intervals. Some people were amused by the hoax, others were angered, and many conspiracy-minded UFO buffs were skeptical of the explanation.

It's true that just because a person has confessed to a hoax doesn't mean the case is solved. After all, people sometimes falsely confess to things they didn't do. A confession (especially an anonymous one) by itself is not credible unless corroborated by physical evidence. Let's analyze the facts of the case from a skeptical investigator's perspective.

1. The formation of the lights is consistent with independently moving objects, not fixed lights on an aircraft. They rose into the air together, stayed in more or less the same formation while in the same air currents, then drifted apart as they gained altitude. In fact, airport officials reported that "the lights were rising as they watched" (Associated Press 2008). Thus, the lights were sighted traveling vertically up into the air (as balloons do), instead of horizontally through the air (as aircraft do). Furthermore, when the lights did move horizontally, they drifted toward the east—the same direction as the wind.

2. Air traffic controllers reported that nothing showed up on their radar. If the lights were the only visible part of a metallic spaceship or airplane, they would have appeared on radar. However, "UFOs" consisting of small balloons, road flares, and some fishing line would be invisible to radar.

3. The way the lights disappeared also supports the hoax theory. They did not zoom away at high speed, as one might expect from an aircraft. Nor did they all suddenly and mysteriously disappear. Instead, eyewitnesses reported that the lights were visible for between fifteen and thirty minutes until they disappeared one by one. This is exactly the pattern we would expect to see from flares that were lit (and launched) in sequence: they would go up, remain lit for about twenty minutes, then the first flare would extinguish. A minute or two later the second would burn out, and so on.

And, as a final nail in the coffin for the UFO buffs who really, really wanted the lights to be mysterious and unexplained . . .

4. One of the hoaxer's neighbors, a Mr. Mailo, actually watched the hoaxer launch the helium balloons and flares. Mailo said the flares were lit about 8 p.m., just before the UFO lights were first sighted.

That explains the mysterious 2008 Phoenix Lights. Any object seen in the sky, especially at night, can be very difficult to identify, and it's no wonder that the lights puzzled many people. All that is needed to create a UFO sighting is one person who may not recognize a light or object in the sky.

This is not the first time that strange lights have appeared in the dark skies over Phoenix. In 1997, similar lights were reported; the military had been dropping flares over a nearby testing range, although many UFO believers rejected that explanation as part of a cover-up. Not all UFO sightings are hoaxes—in fact most are simply misidentifications—but this case shows just how easy it is to fool the public and create a media stir.

Benjamin Radford is a writer and investigator with the Committee for Skeptical Inquiry. His Web site is at www.RadfordBooks.com.

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Tributes by:
HARLAN ELLISON
MARTIN GARDNER
DAVID MORRISON
GREG BEAR
ALAN DEAN FOSTER
JAMES RANDI
KAREN ANDERSON
KENDRICK FRAZIER
ARTHUR C. CLARKE
2001
A SPACE ODYSSEY
THE GREATEST SPACE ADVENTURE EVER WRITTEN NOW WITH A NEW FOREWORD BY THE AUTHOR
The Fountains of Paradise
EXPEDITION
GREETINGS, CARBON-BASED BIPEDS!
RAMA II
THE FINAL ODYSSEY
ODYSSEY THREE

Arthur C. Clarke—the renowned science fiction writer, space visionary, science sage, futurist, and rationalist—died March 19, 2008, at his home in Colombo, Sri Lanka, at the age of ninety. His ideas and writings shaped the space age and made him the most widely known figure the science fiction world has ever produced. We invited several notable figures in science and science fiction to give us their tributes and reminiscences. — EDITOR

Arthur 'N' Me

HARLAN ELLISON®

"Ah, yes; well, good luck with that, Harlan," Arthur C. Clarke said to me while standing barefoot in his pajamas, then smiled and closed the door.

This is how it happened. Not my friend Arthur's first remarks to me nor his last—but auspicious for their context, nonetheless. This is how, why, when, and where it happened.

1956: An upper hallway in the old Biltmore on 42nd Street in New York City. Fifteen minutes earlier I had been apprised (thus confirming suspicions even the dullest schmuck would have long sustained) that my wife-at-the-time, my first wife, Charlotte, had been cuckolding me with a bronzed and heroically statured SCUBA diver named Mike Wilson, a diving companion of Arthur's off the Coast of Coral. They had collaborated on several books.

I am reminded that Wilson was somewhere over six feet tall and I, at 5'5", could have been snapped like a Q-Tip. Nevertheless, as Robert Silverberg has written, "Harlan is fearless," and I went looking for the cad.

He and Arthur were traveling together in NYC for the 14th World Science Fiction Convention, and since I did not know his room number, I went stalking Arthur's. It was perhaps midnight or even slimmer on the clock. I whanged and banged on Arthur's door until the Great Author I had originally met in 1953 shambled to open it.

Blearily, and standing in pajamas the cut and illustrative pattern of which memory cannot, thus far removed from the event, summon up, Arthur goggled at me and said, in his gentle and urbane way, "Whuh . . . whuh . . . izzit,

ARTHUR C. CLARKE
1917–2008

Harluhnnn. . . ?"

I blurted. In a tsunami foaming over with words such as sonofabitch and adultery and death and detestation and, possibly, transfiguration, I demanded of poor, innocent Arthur the immediate whereabouts of his poltroon sidekick. Arthur, of course, had been dead asleep and had not the slightest knowledge of the scapegrace's venue at that moment. I fulminated anew for a few moments, came to my bloody senses to understand that not only was it none of Arthur's concern but that my friend was still half on the nod; I begged his pardon for waking him, and—thoroughly chagrined and ashamed of myself—started back down the corridor.

It may be difficult for those encountering these words to think of the Great Author—a.k.a. the Great Futurist a.k.a. the Knight of the U.K. a.k.a. the Great Extrapolator—as merely a man . . . but Arthur started out as a mere human being not unlike each of us.

Arthur closed his door, paused a beat, reopened the door, stuck out his head, and said to my slumped, retreating back, "Ah, yes; well, good luck with that, Harlan." Smiled. Closed the door.

I thought that was awfully nice of him.

Arthur and I met in the spring of 1953 at a resort hotel just outside Bellefontaine, Ohio. Beatley's On-The-Lake Hotel, actually in Indian Lake, Ohio. Arthur always referred to it as "Beastley's-on-the-Bayou."

He, I, Bob Tucker, Jerry Bixby, Robert Bloch, Lee Hoffman (and other famous names no one reading this will remember) were all friends. Back in "The Day." A simpler, more generous time, kinder of the heart. We were all science fiction fans, and some of us were struggling professionals, and some of us were still in high school. You may sort among those names to ascertain who was which, or whom; whatever.

It may be difficult for those encountering these words to think of the Great Author—a.k.a. the Great Futurist a.k.a. the Knight of the U.K. a.k.a. the Great Extrapolator—as merely a man (as Lee used to call him, paraphrasing Pogo), but Arthur started out as a mere human being not unlike each of us. What I did not know then, in 1953, but was to learn many years later, is that as sharp-edged and too often mean-spirited as American writers can be to each other—usually behind their backs—we are parvenus compared to the Brits, who savage each other with an unending onslaught of ignoble calumny that can just be termed vicious. And so it was, back then, that the first thing I learned "about Clarke" was that he was called Ego C. Clarke.

I pass along this snippet not for any value save that when a Great Man has died, every snippet takes on heft and curiosity. So that this snippet is not lost, I drop it here, with the attendant footnote:

I knew Arthur for more than fifty years. Never once in all that time did I ever encounter even a scintilla of argumentum ad baculum that would speak to Arthur properly being thus monickered.

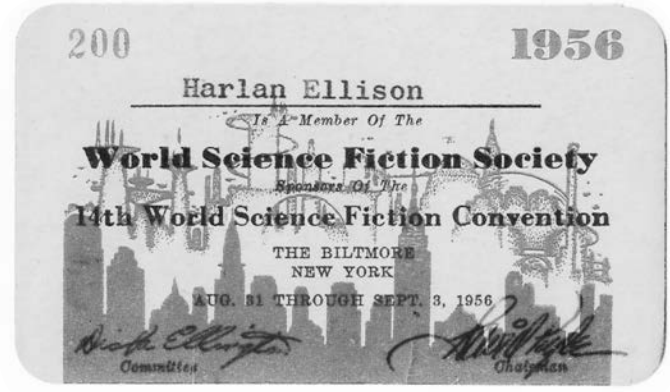

Photo A: Robert Bloch, Harlan Ellison, Evelyn Paige Gold, and Arthur C. Clarke (1953).

Photo B: Robert Bloch, Jerry Pournelle, Harlan Ellison, and Arthur C. Clarke (1980).

Either the canard was a jealous snipe from those floundering professionally in the wake of his vast success . . . or Arthur was a whiz at playing the courteous gentleman.

What may also be difficult for those who have lived in a world where the Great Man has always existed, is the fact that when Arthur first flushed with success, he'd had only two books published. The first was Interplanetary Flight in 1950, but though he had been a fellow of the Royal Astronomical Society and became chairman of the British Interplanetary Society in 1949, this was half a decade before Sputnik, and people who talked about Interplanetary Flight were only a smidge-cut less certifiable than those who frequently see portraits of Jesus in their Mexican food. Interplanetary Flight was not a great commercial success. So strapped was Arthur that he accepted a commission tendered by his then-literary agent, Scott Meredith, to write an original novel slanted for young adults. Islands in the Sky was one of the Winston series packaged by the Meredith Agency, and it came out not long before Arthur and I became friends. But it was with the publication of The Exploration of Space in the same year, 1951, that he suddenly became not just another Brit scrivener trying to crack the big U.S. market but a sudden sensation.

Now, fifty-seven years later, it may be difficult for some of you to fathom how genuinely B-I-G was the appearance of The Exploration of Space.

It was the very first ever book even remotely associated with science fiction, or the core interests that formed the nucleus of that genre, to be selected for The Book-of-the-Month Club. In these days, when "franchise" authors crank out dumpsterfuls of proscribed crap—one a year like crazy clockwork—full of writing so pallid and ephemeral that it is ennobled by the insult "creative typing"—stories so instantly forgettable they go through you like beets through a baby's backside—to have One of Our Own reach the pinnacle of the game in 1951 was beyond breathtaking.

Arthur did that. To us, he was a Great Man long before most of you even knew he walked this planet he loved so deeply.

Soon after all the foofaraw about how soon-to-be-Sir Arthur had predicted communications satellites and blah-blah-blah, he and I found ourselves by chance simultaneously sans dinner plans on West 47th Street. Arthur was in from Sri Lanka, I was in from Los Angeles, and we bumped into one another at the corner of Sixth Avenue.

So we said what-the-hell and decided to go to dinner without letting anyone on either side of us know where we were, and we hiked over a block to the old, famous Steuben Tavern and had a swell evening. It was nifty, and it was swell; and sometime in the middle of the schnitzel, ribbing him about his new Great Fame, I asked him, "Hey, kiddo, I know you're famous for extrapolating all these great advances, but tell me the biggest boner you ever predicted."

And Arthur, who ribbed me in a completely different Brit way than I did as a Yank, thought about it for a few moments and answered, "I was smart enough to know we'd see the moon landing in my lifetime, but I wasn't smart enough to know we'd be watching it as it happened in our living rooms on the telly."

Look at Photo B. It was taken as an homage to Photo A, more than a quarter century after the former. 1953: At Beastley's-on-the-Bayou, the great fantasist Robert Bloch has his arm around a pipe-smoking smartass, me at age eighteen. Next to me was standing the awfully beautiful Evelyn Paige, who was the wife of the editor of Galaxy Science Fiction, H.L. Gold (who published many of Arthur's best stories), and there at the end of the progression is Arthur, who came to Los Angeles for a signing.

As time, space, and gravity had their way with us, we spoke less frequently. The years slipped by in shadow, but three years ago or so, Arthur sent me a birthday card . . . and a photo from Sri Lanka. It is a spiffy photo of Arthur in a well-starched, untucked blue Hawaiian sport shirt festooned with leaping dolphins.

At Barry Levin's old shop on Westwood Boulevard we gathered the group redux. Bob is where Bob was, I've been moved over a space, and the place Evelyn held is occupied by the estimable Jerry Pournelle. And there, again, was my friend Arthur, now not so tall. I consider this a treasure because. . . .

As time, space, and gravity had their way with us, we spoke less frequently. The years slipped by in shadow, but three years ago or so, Arthur sent me a birthday card (I usually called him on his natal anniversaries) and a photo from Sri Lanka. It is a spiffy photo of Arthur in a well-starched, untucked blue Hawaiian sport shirt festooned with leaping dolphins. The shot was taken from slightly above, so he's looking up at me with that smile that age never altered, and hugged to his side with his left hand is a baby-blue T. Rex that is wearing, I swear, exactly the same grin.

It is my smug, secret suspicion that the saurian felt overcome with honor and camaraderie at being permitted to have his photo taken with such a Great Man.

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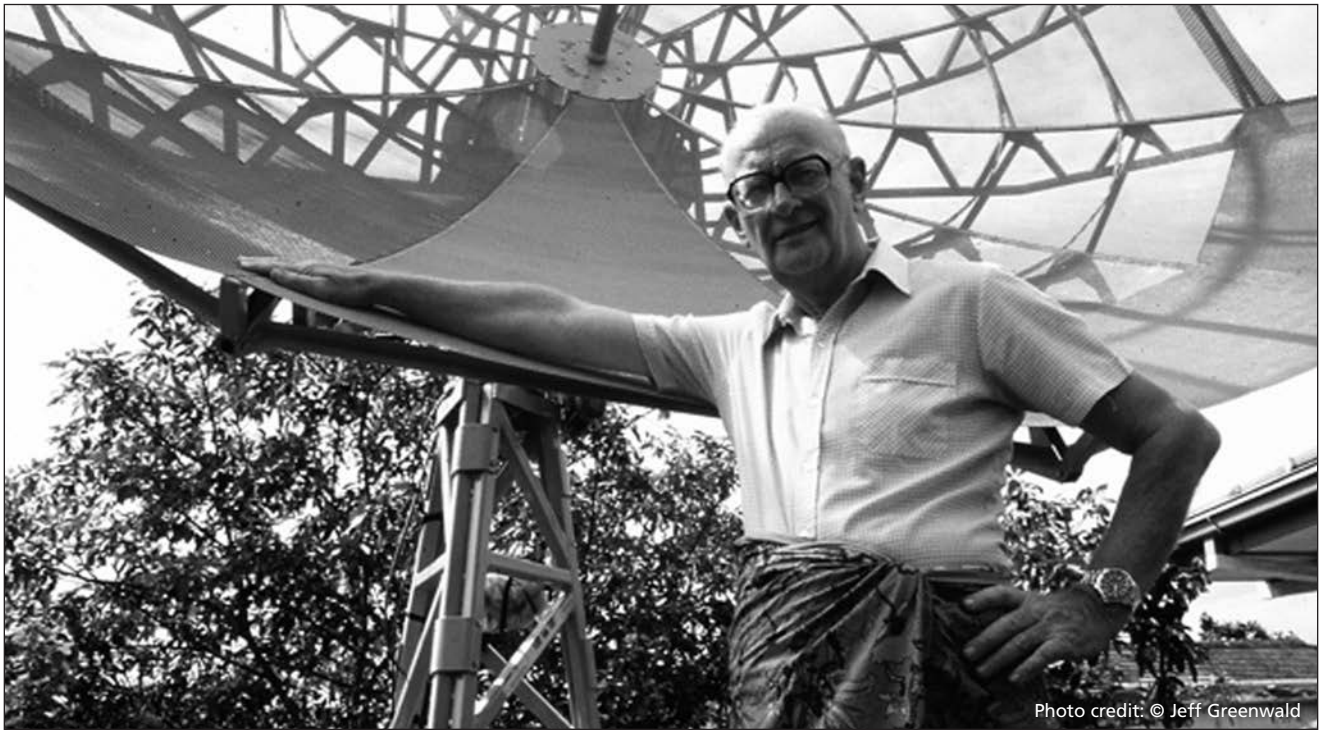
Harlan Ellison is a prolific writer of short stories, teleplays, essays, and criticism. He wrote for the original Star Trek and Outer Limits television series, and his speculative fiction and science fiction have won multiple Hugo and Nebula awards. CSICOP awarded him its Distinguished Skeptic Award in 2002.



MARTIN GARDNER

Only once did I have the great pleasure of meeting Sir Arthur C. Clarke. It was for lunch in New York City's Greenwich Village. Also at the table was a woman who talked incessantly about Jung and a handsome young black man who I later learned was the boxing champion of Sri Lanka. Arthur and Isaac Asimov at that time were, of course, the two giants of science fiction.

My acquaintance with Arthur, and my correspondence with him, arose from a mutual interest in recreational mathematics. The wall in Clarke's early story "The Wall of Darkness" is a one-sided Moebius band. He was so intrigued by my Scientific American column on pentominoes that he wrote an article titled "Help! I'm a Pentomino Addict!" The twelve shapes played a role in one of his novels as a model of life's endless combinatorial possibilities.

Sir Arthur not only will be remembered for his popular science fiction but also for the accuracy of his many predictions and for two memorable remarks:

"A sufficiently advanced technology is indistinguishable from magic," and, "When a distinguished but elderly scientist states that something is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong."

Less well known, but my favorite, is the following: "I sometimes think that the universe is a machine designed for the perpetual astonishment of astronomers."

Martin Gardner's latest book is The Jinn from Hyperspace (Prometheus, 2007), a collection of essays and reviews. For twenty-five years he wrote the Mathematical Games column in Scientific American.

DAVID MORRISON

Science fact and science fiction lost one of our most visionary and influential heroes with the death of Arthur C. Clarke. He inspired my generation of space scientists with his vision of an exciting, transforming future beyond the Earth in novels such as The Sands of Mars, Islands in the Sky, Earthlight, Against the Fall of Night, and especially Childhood's End. His creation with Stanley Kubrick of 2001: A Space Odyssey, which appeared in theaters a few months before Apollo 11, represented the zenith of science fiction movies—although, perhaps not so surprising in retrospect, it was not well reviewed and received only one Oscar for special effects.

I would particularly like to acknowledge Clarke's contribution to my own field of understanding and protecting the Earth against

cosmic impacts. I chaired the first scientific study of cosmic impact hazard, responding to a 1990 request from Congress to NASA. Our team proposed a "Spaceguard Survey" of near-Earth asteroids, and we called ourselves the Spaceguard Working Group. The name "Spaceguard" had been coined in Clarke's novel Rendezvous with Rama, in which it described a future system to detect any incoming asteroids or comets in time to protect the Earth from a catastrophic impact. Clarke graciously endorsed our use of the term, which has become synonymous with asteroid surveys. He supported our efforts to initiate this survey and was pleased to have his name associated with such a worthy endeavor.

I think it's safe to say that Sir Arthur Clarke was one of the greatest visionaries of the twentieth century. His futuristic sensibility was almost flawless, and he had his hand in many speculations that strayed far from his central expertise, space flight.

Partly inspired by the new attention to the impact hazard, Clarke wrote a novel in 1994 on this theme: Hammer of God. The plot concerns efforts to deflect a large comet on a collision course with Earth. This novel was acquired by a Hollywood studio and became the basis for the 1998 film Deep Impact, although Clarke himself did not write the script. Deep Impact was an intelligent film, realistically depicting the impact threat and the ways we might respond if faced with such a calamity. Unfortunately it was released at the same time as the blockbuster film Armageddon, which made no effort toward accuracy, either scientific or political. If your memory of these two impact films is dominated by the antics of Bruce Willis in Armageddon, I recommend you watch Deep Impact again. Also well worth reading is Clarke's New York Times op-ed of August 14, 1994, entitled "Killer Comets Are Out There. Now What?" for an articulate defense of the importance of the Spaceguard Survey and future efforts to develop a defense against cosmic impacts. (The New York Times reprinted this 1994 op-ed on March 23, 2008).

All of us who have been entertained and inspired by Sir Arthur Clarke mourn his passing.

David Morrison, a fellow of the Committee for Skeptical Inquiry, is a planetary scientist and astrobiologist who has played a leading role in developing the Spaceguard Survey of Near Earth Asteroids.

GREG BEAR

In the mid-1960s, when I was fourteen or fifteen, I read Sir Arthur's book Childhood's End and experienced the first of a number of Clarkeian "epiphanies," what I later referred to as intellectual highs, induced by the breadth and poetry of his vision. Thereafter, I read everything by Arthur C. Clarke I could find—stories, novels, and essays—waiting in anticipation for the premiere of 2001: A Space Odyssey. That film had a huge impact on me and a number of my friends, and we met Arthur in San Diego when he was on tour. Over the years, my friends and I celebrated various space achievements by returning to see 2001 at the local Cinerama—in those days, a single film could play for years in one large theater. By the 1970s, I was corresponding with Arthur off and on, and that continued into the age of e-mail and well into my own career as a writer—which Arthur, to my delight, always supported generously.

I think it's safe to say that Sir Arthur Clarke was one of the greatest visionaries of the twentieth century. His futuristic sensibility was almost flawless, and he had his hand in many speculations that strayed far from his central expertise, space flight. But his inspiration and influence in that area will always be the highlight of his life. Engineers, astronauts, armchair astronauts—all found guidance from Arthur's works and his steady, civilizing presence on the world stage.

It's the hallmark of a great writer that his ideas continue to pop up in the works of others, bright and shiny, as if newly minted. When I read about the much-vaunted "singularity," I have to think back to Childhood's End, which perfected the science fictional treatment of that moment when humanity, intelligence, and the very future itself passes out of our simple human ken. And of course, Arthur gave us one of the first really convincing pictures of that art form that now promises to supplant books, the immersive video game, in "The City and the Stars."

This year, I'm publishing my own homage to Arthur and his fellow British visionaries, H.G. Wells, William Hope Hodgson, and Olaf Stapledon. It's called City at the End of Time, and I would have been delighted to have Arthur read it. That won't be possible now, but the inherited inspiration remains, for me, as strong as ever.

Sir Arthur leaves us a long list of achievements that can only grow in importance over time. But what I will miss the most is the puckish sense of humor, the self-acknowledged ego, the sharp awareness of both history and science—in short, those friendly, piquant answers to all my letters and messages over the years.

Greg Bear is the author of such novels as Eon, Blood Music, Darwin's Radio, and, most recently, Quantico and City at the End of Time.

ALAN DEAN FOSTER

March 1, 1999: We had just driven down from Kandy, and my driver finally managed to find Arthur's neighborhood. "Very expensive area," he told me. Like most of the neighboring residential properties, Arthur's was surrounded by a nearly two-story-high wall whose top was lined with broken glass and other inducements designed to persuade would-be thieves to go elsewhere.

Arthur was in his study, wearing traditional Ceylonese attire and a big smile. It was a long, rectangular room filled with books, gifts, mementos, and souvenirs of his long career, from a plaque naming an asteroid after him to a painting by a Russian astronaut.

Photo credit: © Jeff Greenwald

A piece of moon rock held pride of place. His desk was a simple wooden affair, piled with papers and a computer off to his left. While I was there the computer was constantly announcing the arrival of new mail.

"What do you think of the house?" he asked me.

"Nice," I admitted. "Spacious."

"It was once owned by the Bishop of Colombo. It's one of only two houses in the city with a private elevator." His eyes twinkled. "Now I want to show you something." I didn't want to see anything—I was with Arthur C. Clarke in his study and I wanted to talk. "But first sign my guest book."

I did so and stole a moment to flip through and note a few of my predecessors. Elizabeth Taylor. Prince Philip. Steven Spielberg.

"Did you know," he told me when I resumed my seat on the other side of the desk from him, "that H.G. Wells and Orson Welles once met?"

I did not and proceeded to listen in astonishment as he played the approximately five-minute-long interview conducted in Texas by an enterprising radio station when Wells and Welles happened to find themselves in the same city. He made me a copy, which I dutifully passed on to others.

We talked awhile and swapped jokes, and he graciously signed the couple of books I had brought with me. "Do you play table tennis?"

It was a question I had not anticipated. "A little."

"Good! Let's go to the club."

A pair of manservants helped him into what might have been the only cherry-red Mercedes-Benz in all of Colombo, and we were off.

The table tennis room at his club was all bare concrete, walls and floor, like an Army lavatory from which all the fixtures had been removed.

"One ground rule," he told me as he steadied himself on the other side of the table. "You can only hit to my left side. I can't move across or I'll fall down."

I nodded that I understood, and the eighty-one-year-old master of science fiction proceeded to run me ragged. Only later did I find out from one of his adopted children that in his youth Clarke had been a championship table-tennis player. No wonder he understood gravity and trajectories so well.

As we played, I could see the years drop away from him. Soon he was grinning and chuckling like a teenager while decrying his inability to hit a tough shot of mine. It was a wonderful thing to see, this temporary sloughing off of years and the inescapable weight of his debilitating disease.

Back at his house, he ordered Chinese take-out for all of us: himself, me, and his extended, adopted half-Sri Lankan, half-Australian family. We spoke of writing and diving and the civil war that continued to torment his beloved island. I mentioned all the machine-gun emplacements I had encountered in the center of main roads, and he just shook his head sadly.

Later, back in his study as we were chatting, he paused. "I want to show you something else, but I can't remember what it

is. Just give me a moment—it will come to me." He turned to his computer—and disappeared. His expression vanished as he was instantly subsumed in a pose of absolute deliberation. For a couple of minutes he went somewhere else. Gazing at his face as he stared at the computer monitor I felt as if I was looking directly at the intellect, suddenly and miraculously made visible, that had produced Childhood's End and Expedition to Earth, and much, much more.

I wish I had taken a picture. I don't believe for a second that it would have shaken his concentration in the slightest.

Author of 107 books and numerous other works, Alan Dean Foster met and corresponded with his colleague Sir Arthur C. Clarke over a period of more than thirty years.

Photo credit: © Jeff Greenwald

Gazing at his face as he stared at the computer monitor I felt as if I was looking directly at the intellect, suddenly and miraculously made visible, that had produced Childhood's End and Expedition to Earth, and much, much more.

JAMES RANDI

I first met Arthur at his home in Sri Lanka where I had gone with an NBC television crew during the taping of a TV special, "Magic or Miracle?" That was in 1983. The man credited with having "invented" the geosynchronous satellite was a trifle embarrassed. The president of Sri Lanka was due at his home to watch a football game via the only satellite dish that existed in all of the tiny island nation—Arthur's dish—and that device was lying on its side, a victim of a recent storm. His mobile telephone, too, was "dead" because its charger had become disconnected, and I had the honor of wriggling down underneath a massive desk to plug in the transformer for him; the bits of wildlife I ran into underneath, I leave to your imagination.

Arthur facilitated our visit, and I recall that when we arrived at the airport and announced who our host was, we were instantly moved through immigration and customs and escorted outside to our waiting transportation; this man was highly respected in his new home and once commented to me that he found it far more agreeable to be a large fish in a small pond than any other configuration of those elements that he could imagine.

Over the years, I ran into Arthur C. Clarke several more times and once had the pleasure of hearing him speak at the United Nations. His thought process was evident from his speaking manner. As in his writing, everything he delivered was clear, concise, and effective.

I was an invited guest in New York City at the premiere of the Kubrick film 2001, and I saw Arthur in tears when he began to realize just how Kubrick had ignored the subtleties of the original story; we were both dismayed by the erroneous interpretations members of the audience offered as explanations of the "psychedelic" sequences in the film. I suggest that readers examine his short story "The Sentinel" —upon which that film was based—and The Lost Worlds of 2001, then see the film again for a better understanding of what it should have shown.

Arthur was a delight. Yes, I grieve at his passing, but—much more important—I celebrate his existence. If you want to see him at his very best, look up the short story titled "The Nine Billion Names of God." When you get to the last line, if you don't gasp, Arthur might have bored you. . . .

James Randi is a professional magician, lecturer, and investigator of unusual claims. His books include The Truth about Uri Geller, Flim-Flam!, The Faith Healers, and An Encyclopedia of Claims, Frauds, and Hoaxes of the Occult and Supernatural.

KAREN ANDERSON

At thirteen, Arthur Clarke built his first telescope; when at nineteen he had to leave school and begin earning a living, he never lost sight of the stars. Besides working, he was active in the fledgling British Interplanetary Society, reading science fiction in pulp magazines, and writing for the fan magazines devoted to them.

He signed himself "Ego" in contributions to the Los Angeles-published Voice of the Imagi-Nation. Later, there was a joke in the fan community that "Ego's favorite drink is ACC-olade." To us it seemed only fitting, in 1998, that he received a knighthood.

In the RAF he worked with radar and helped develop Ground Controlled Approach. His technical paper on geostationary radio satellites was published in 1945, and his first story in Astounding Science Fiction came a year later. Returning to school on a GI Bill-type scholarship, he took his degree in mathematics and physics and found within a few years that he could support himself by writing.

He was devoted to communication and the spread of knowledge. From the time the first communications satellite covering Asia took its place, educational programs were broadcast to every village that could afford a receiver. Clarke himself, who by then had found Ceylon (now Sri Lanka) his ideal home, was given a dish by the government of India.

He never separated himself from the science-fiction community, continuing to take part in World Conventions as long as his health permitted. When I arrived at the main hotel for the 1979 convention in Brighton, Arthur greeted me with a comradely hug.

Shortly after his death, I went with some fellow science-fiction folk to Stovepipe Wells, Death Valley, California. On the first night we drove behind the general store to the airstrip to view the clear, dark sky.

Before our driver stopped, I opened the moon roof and looked up—"My God!" I cried. He jammed on the brake.

"What's the matter?"

Nothing was the matter—but that wasn't what I told him. I answered, "It's full of stars." And the three of us got out, with the imagined strains of "Also Sprach Zarathustra" around us, to see the heavens.

Karen Anderson, an active participant in the science fiction community, writing both solo and with her late husband SFWA Grand Master Poul Anderson (1926–2001), met Arthur C. Clarke many times.

KENDRICK FRAZIER

I had my considerable say about Arthur C. Clarke in my lengthy essay review "Visionary of 2001, and Way Beyond" in our May/June 2000 issue (ostensibly a review of his wonderful essay collection Greetings, Carbon-Based Bipeds! but really more a profile of Clarke and his ideas). So I will only reiterate a few points and raise a couple of new ones.

Without his knowing it, as I am sure he did for countless others, Clarke shaped and guided my professional life and interests. I remember as a school kid in the '50s coming across in our school library the newsletter of the British Interplanetary Society, which he then headed. That was so cool! Here we hadn't even gotten into space yet, and already there was an "interplanetary" society. Science and space seemed to be the future, and we wanted to be part of it.

His science fiction, like Heinlein's and Bradbury's and Asimov's, let loose our imaginations. We may have lived in small, isolated towns, but our minds were free to roam the universe. His writings, fiction and fact, were always a combination of clear-thinking, science-informed intellect, and soaring creativity expressed in prose of absolute clarity. What a rare and wonderful combination!

His books influenced generations of us. A glance over my own shelves finds these volumes, a mere sampling of his tremendous output: (Nonfiction) Interplanetary Flight, The Exploration of Space, The Coming of the Space Age, Profiles of the Future, Report on Planet Three, and the aforementioned Carbon-Based Bipeds; (short story collections) The Nine Billion Names of God; (novels) Childhood's End, Rendezvous with Rama, The Songs of Distant Earth, Fountains of Paradise, and of course the 2001 novel series: 2001: A Space Odyssey, 2010: Odyssey Two, 2061: Odyssey Three, and 3001: The Final Odyssey. I am now rereading my copy of The Lost Worlds of 2001, Clarke's account of the writing of his novel and the screenplay with Stanley Kubrick, combined with never-used "outtake" chapters he wrote for the novel. These were fully developed alternative scenarios written and discarded as Clarke's and Kubrick's ideas clashed and evolved. Interesting reading still today.

I heard him speak in person only twice, in my Washington days, once at the Smithsonian Institution (where he inscribed my copy of Profiles of the Future to my wife and me) and once at the National Geographic Society. But his novels and nonfiction works were all freely available, and with new books coming out regularly, we didn't have to talk with him to benefit from his inspiration. Shortly after becoming editor of the SKEPTICAL INQUIRER, I was delighted one day to receive a humorous letter to the editor from him intriguingly titled "Martian Technology," inspired by our Viking landings on Mars and whimsically suggesting we must

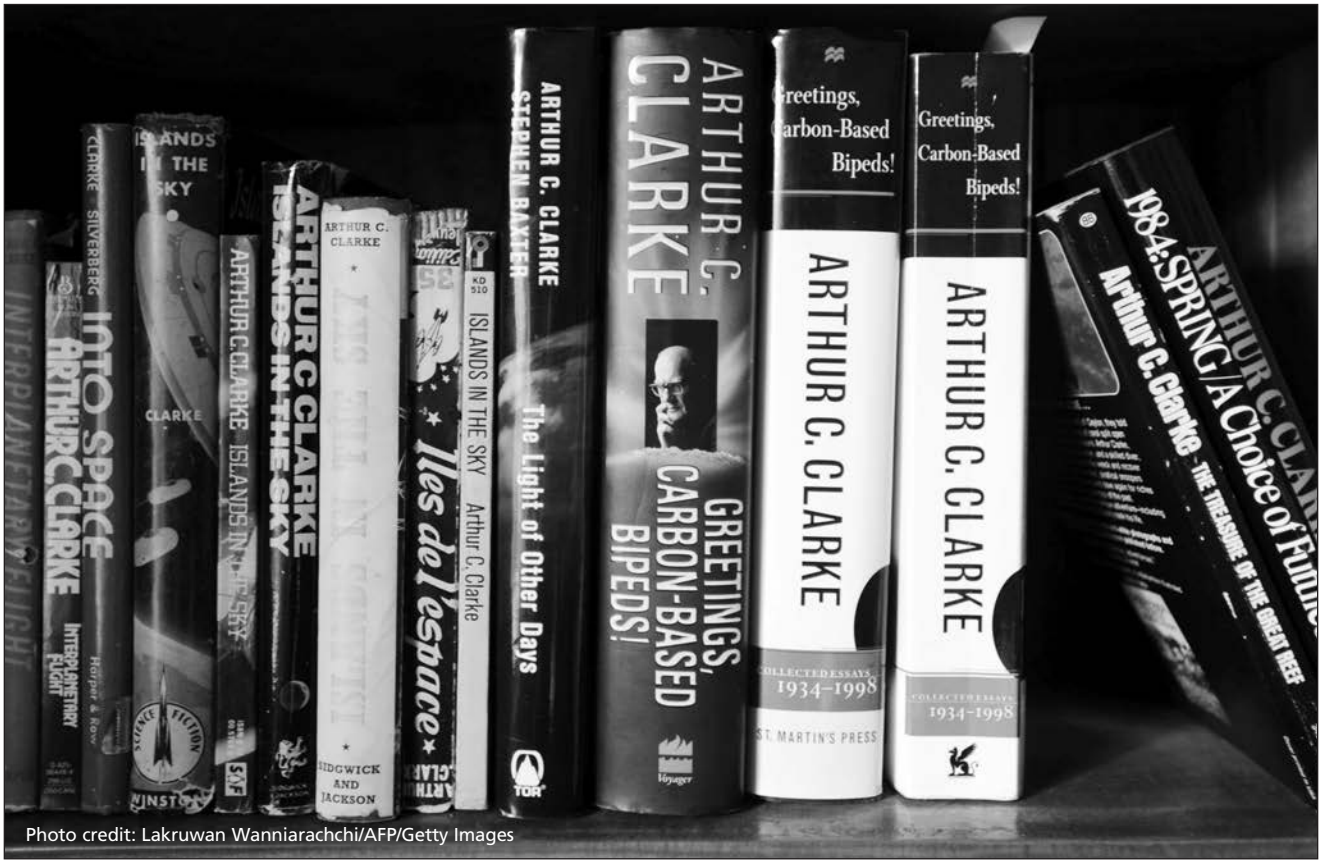


Photo credit: Lakruwan Wanniarachchi/AFP/Getty Images

have found a way to camouflage the Martian canals (I published it in our Winter 1978 issue; I'm sure you all still have your copies!).

Over the ensuing years, we corresponded congenially from time to time. He was such a firm exemplar of reason and rationality, we could always count him as a friend and colleague.

In my 2000 review of Carbon-Based Bipeds, I took appreciative note of his included essay "Credo," which stated his decidedly skeptical views about religion, and lamented that I hadn't known of it to include in our then most recent Science and Religion issue, in 1999. We rectified that. With Sir Arthur's kind permission, it appeared in our September/October 2001 Science and Religion special issue.

In his later years he was quite ill and friends didn't want to bother him too often. But my one regret is that I didn't try to engage him in discussion of a question that I think is important to our times: How disillusioned was he that we hadn't maintained the promise and momentum of the Apollo years in pushing outward into space? The first moon landing of 1969 came almost as early as anyone could possibly have envisioned. But Clarke and most other enthusiasts thought that would be just the beginning. The year 2001 was still a long way off, and routine manned trips to the moon and beyond by the early twenty-first century seemed fully credible. How disappointing that since Apollo 17 in 1972 we haven't even ventured beyond Earth's orbit.

Yes, cheaper and safer unmanned spacecraft have been doing the exploring for us to wonderful effect, but no one back then thought the manned space program, once it got going, would soon become so circumscribed. Instead, it was the microelectronics revolution that took off geometrically, with Moore's law accurately describing its enormous growth and progress. That's what Clarke and others thought would happen with human spaceflight. What happened?

Clarke's innate technological optimism may have gone out of style in these more cynical and economically challenged times (I hope that optimism someday will return in a more sustainable form), and his full life of ninety years has now concluded. But he will live on in our memories forever. His work will certainly endure, continually being rediscovered by new generations of inquirers, and in that way he will continue to influence and shape the future.

Kendrick Frazier is editor of the SKEPTICAL INQUIRER and a former editor of Science News. Among his books is Solar System (Time-Life). □

Anomalous Cognition: A Meeting of Minds?

A conference on "anomalous cognition" features unusual claims and raises issues on the role of scientific evidence, replicability, and philosophy of science, plus another: when should one stop looking for evidence in support of an elusive effect?

AMIR RAZ

"What exactly is anomalous cognition?" As a cognitive scientist, I wondered about this question as I was peering over an intriguing invitation to attend an exclusive Meeting of Minds (MoM) conference on this very topic.[1] I had been counting the days before the MoM, until finally in July 2007 about sixty researchers got together at the University of British Columbia in Vancouver, Canada. To avoid media coverage, the organizers targeted a select group of speakers, and attendance was by invitation only. I was surprised when the conference turned out to be a series of presentations, including reports of what are arguably the best accounts in favor of the possibility of things such as parapsychology and psychic influence, also known as psi. The meeting brought together behavioral scientists and experimental psychologists—most of the audience for the talks—a few skeptics, and a group of self-labeled psi researchers, most of the presenters. As a special treat, a handful of renowned panelists—two Nobel laureates and two distinguished professors of psychology—offered pithy summaries of their impressions following the presentations. It did not take long to realize that anomalous cognition is a new euphemism for the time-honored claims of psi, including extrasensory perception (ESP) and telekinesis.

Initially, I was not sure whether I was invited as a scientist, a skeptic, a magician, or as a friend of one of the organizers. Although I am not a parapsychologist, I am genuinely interested in what I refer to as atypical cognition and rarely shy away from investigating areas within my purview, even those considered as fringe by most of my colleagues. For example, I have been studying the brain computations that occur during planes of altered consciousness, including the cognitive neuroscience of phenomena such as sleep-deprivation, hypnosis, and meditation. At the same time, I consider myself a skeptic—of the deferentially inquisitive rather than gravely unyielding variety—who thrives on converging independent replications of rigorous empirical evidence, not on doctrinaire viewpoints. Finally, it was nice to see among the MoM guests a few fellow conjurors who are, foremost, scientists. Their presence was reassuring, if only to avoid thinking about my answer to the phrase "Are you the best magician among scientists or the best scientist among magicians?" which I have heard one too many times. In that crowd, I was neither.

Having spoken to one of the organizers a few weeks before the meeting, it was my understanding that the conference's leadership envisaged it as an opportunity to present some of the most compelling data sets in support of anomalous cognition and to urge "mainstream" scientists to foster sufficient open-mindedness to consider a more programmatic investigation into these fields based on these findings. That approach seemed fair and appropriate. Although it was unclear to me at that time what exactly anomalous cognition is, I thought then—as I do now—that it is certainly legitimate to advocate for the possibility of anomalous cognition, including psi. The agenda at the meeting, however, went beyond asking that "mainstream" scientists consider the possibility of psi: it intimated that scientific evidence for psi was solid and replicable. Furthermore, it went on to propose that a major goal of the MoM was to consider why scientific and lay communities do not appreciate the existence of psi.

Interestingly, a number of presenters who argued for the possibility of psi were mainstream researchers, at least in the sense that they had trained and worked in some of the world's most prestigious institutions of higher learning. While several speakers judiciously implied the possibility of psi, a few explicitly claimed that, based on rigorous data, several anomalous phenomena were veridical. It is perilous, however, to overlook the tenuous boundary between suggesting the possibility of certain phenomena and insinuating—not to mention explicitly submitting—that such anomalies actually exist. During the MoM several speakers blurred this boundary, some in letter and some in spirit, and a few unflinchingly crossed it.

As the conference unfolded, serious issues began to surface concerning the role of scientific evidence, replicability of findings, and philosophy of science. In addition, another question gradually emerged, one that scientists seldom ponder: when is it rational to end the pursuit of a hard-to-pin-down goal? In other words, when should one stop looking for evidence in support of an elusive effect?

As a matter of good practice, members of the scientific community tend to be skeptical. Science thrives on a skeptical approach, and scientists are typically conservative in what they consider a "generally accepted view." Two types of errors, however, stand in the way of any gatekeeper of science. One pertains to how nonexistent phenomena may pass as real or generally accepted; the other pertains to how real phenomena, which should be generally accepted, may pass as nonexistent. Scientists typically pay more attention to the former trap, and some consequently tend to be overzealous or dogmatically skeptical; members of this staunch group can be skeptical of their own belly buttons. The second trap, however, is usually less explored. If psi effects are real, then the scientific establishment needs to be careful not to deny a phenomenon that may later become a generally accepted view.

Amir Raz holds the Canada Research Chair in the Cognitive Neuroscience of Attention at McGill University and the SMBD Jewish General Hospital, where he heads the Cognitive Neuroscience Laboratory and the Clinical Neuroscience and Applied Cognition Laboratory, respectively. E-mail: amir.raz@mcgill.ca.

Carl Sagan popularized Marcelo Truzzi's dictum that extraordinary claims require extraordinary proof. Although Truzzi used the word "evidence" rather than Sagan's "proof," the former, too, had paraphrased earlier statements by great skeptics such as David Hume and Pierre-Simon Laplace. Most scientists still uphold the "extraordinary" motto; however, many of them might not realize that later in his life Truzzi recanted his own maxim. While we can speculate why he did, it remains unclear what constitutes an extraordinary claim. Does claiming to possess X-ray vision or that the sun will not shine tomorrow count as extraordinary? Deciding on what constitutes an extraordinary claim is probably related to our working knowledge—the proverbial a priori Bayesian probabilities with which we navigate the world. We typically use the inductive process to decide whether claims are extraordinary. It would be easier to accept X-ray vision, for example, if we suddenly discovered special receptors for that wavelength in the human body. The presence of such receptors is unlikely—if only because they have eluded us heretofore—but not impossible. That the sun will not shine tomorrow is perhaps a more extraordinary claim because our inductive experience, not to mention our knowledge of physics, suggests otherwise. In addition, while it may be difficult to agree on what would lend extraordinary support to a claim, scientists usually agree on what constitutes unimpressive evidence. Thus, for example, experimental results that do not replicate, effects that are very small and tenuous, flaws of design and methodology, insufficient sample size, inadequate statistical analyses, and lack of a theoretical basis may all contribute to weak evidence.

Conducting parapsychology experiments is an unprotected legal act: anyone can do it without a special license. At the conference, a few talks featured nonpsychologists, including physicists, engineers, and other professionals with little or no training in behavioral science, who nonetheless reported data from studies they conducted in experimental psychology. While at least some of these studies were markedly inadequate and contained glaring shortcomings, others consisted of more careful efforts, sometimes with intriguing results. Physicists with little training in behavioral science, however, are probably not the best professionals to conduct complex psychological experiments in the same way that experimental psychologists with little background in theoretical physics are likely suboptimal candidates to carry out empirical research in quantum mechanics. Of course, individuals who combine psychology with relevant interdisciplinary knowledge, including that from the exact, life, social, and engineering sciences, may have relative merits. In this regard, magicians—those performers who are well-versed in the art of human deception and trickery—may have especially good insights to offer. Whereas I have been an active magician and spent considerable time following claims of the paranormal, I am now a professional academic scientist, at least in the sense that a reputable university supports my research and salary. These credentials make me neither omniscient nor an authority on truth. But they do suggest at least some experience with and perhaps proficiency in assessing psi claims.

Science provides an evanescent form of truth. We never get there, but we can judge how close we are. One test that we can perform requires the convergence of evidence over multiple researchers, methods, labs, and periods. We should probably apply the same time-honored, scientific principle to the study of psi. The psi phenomena reported in the conference, however, tended to comprise very small, elusive effects that were difficult to replicate. In the few cases seemingly supported by replication or meta-analysis (a statistical method that can provide a more complete picture than individual small studies can), multiple caveats cast long shadows over the raw data and the inclusion/exclusion criteria of specific studies. Statistical analysis, however rigorous, is independent of the quality of the unprocessed information: it crunches both meaningful and less meaningful data indiscriminately. Thus, independent of the statistical methods, interpretation of the results is inconclusive at best.

It became clear that proponents of the existence of psi, who typically claim that evidence for psi is bona fide and replicable, largely base their claims on the results of several meta-analyses. It is precarious, however, to rely almost exclusively on the outcomes of meta-analyses for support. Meta-analytical studies are retrospective, not prospective, and confound exploratory with confirmatory investigation. In addition, in the known cases where more than one team of investigators have conducted a meta-analysis of the same research domain within psi, the conclusions have been strikingly different (e.g., a psi proponent reported a meta-analysis of Ganzfeld studies with an average effect size that significantly differed from zero with odds of more than a trillion to one while another meta-analysis of the Ganzfeld data concluded that the average effect size was consistent with zero). This lack of robustness is difficult to reconcile.

Scientists, including the better and smarter of them, are fallible beings prone to the entire spectrum of human behaviors and blunders. People, including scientists, often ask unscientific questions: do you believe that hypnosis can reduce pain? Do you suppose that Prozac can help depression? Pristine scientists, however, do not believe or suppose. Instead, they look at the data and ask whether the evidence supports the hypothesis. At least in theory, researchers' beliefs should be immaterial to the results of their experiments, because science is about empirical evidence. In reality, however, the experimenter's beliefs may introduce a substantive bias to the interpretation of data and sometimes even to more nuanced aspects. For example, beliefs and attitudes may bias participant recruitment and influence their expectations, affect feedback, and may even subtly permeate data collection and analysis. At the MoM, it quickly became evident that people had strong beliefs. "What kind of data would make you change your mind?" I asked many a colleague. While several associates danced around the answer with grace and elegance, most coy responses amounted to one troublesome sentiment: "none."

In a short, informal gathering following the main MoM event, a few participants suggested that perhaps psi effects are not amenable to standard scientific scrutiny because the alleged effects, when they do occur, typically disappear soon after the initial experiment, thereby preventing replication. This "decline effect"—the tendency of psi phenomena to wane over time, sometimes reaching chance levels—is most peculiar. Another commonly reported outcome is the "experimenter effect": a difference in participants'

performance as a function of the individual who is administering the experiment. It may be interesting to further pursue the latter, as it may also elucidate the therapeutic alliance we so desperately seek with our health practitioners. Nonetheless, we should heed Karl Popper, an influential twentieth-century philosopher of science, who taught us that a proposition or theory is scientific if it permits the possibility of being shown false—the falsifiability criterion. The history of science shows that many theories were not initially falsifiable not because they were not sufficiently well-operationalized in terms of measurable variables—as was the case in Freudian theories, for example—but because they were not fully developed. Such theories, however, have often served a valuable purpose. Proponents of psi may feel that they operate in a similar climate: they might not yet be ready for "prime time" but may want to use the controversy surrounding psi to generate interest and perhaps even a large body of research from which new theories and empirical findings can evolve.

Theory is important, and the life of the scientific theoretician is anything but easy because experiments are inexorable evaluators of one's work. These unfriendly judges—the experiments—never say yes to a theory and in the great majority of cases assert a flat-out no. Even in the most favorable of situations, they suggest only a "perhaps." Historically, rather than anchor their observations in a theoretical framework, most proponents of psi have focused on a technicality: their pivotal criterion for the presence of psi hinged on obtaining a statistically significant departure from chance. It became gradually evident, however, that in this way it was difficult to specify what properties typified psi and what criteria determined its absence. Nowadays, theories of psi abound, with most loosely brushing against quantum theory and generating no specific, testable, and falsifiable predictions. Such theories, some rather grandiose, appear especially disjointed, as they are not grounded in supporting experimental data.

"A wise man . . . proportions his belief to the evidence," wrote Hume in his 1748 essay Of Miracles. Having attended all the talks at the meeting, the collective evidence that I have examined does not support the hypothesis that psi phenomena exist. Neither I nor anyone else, however, can reject this hypothesis and conclude that such phenomena do not exist. For example, based on insufficient evidence we cannot decisively conclude that the Tooth Fairy does not exist. But the burden of "proof" rests with those who make the extraordinary claim. On the one hand, when intriguing nascent evidence presents itself, further investigation should ensue. On the other hand, skeptics will probably continue to maintain that psi is unlikely, and proponents will almost certainly continue to look for new ways to demonstrate their claims.

The air was effervescent as each panelist offered an extemporaneous eight-minute summary. Peppering their comments with humor and panache, the psychologists were largely unimpressed by the evidence and pointed to a number of the abovementioned weaknesses. The Nobel laureates, however—one in physics and one in chemistry—echoed a favorable and more accepting tenor. One mentioned atmospheric science as a metaphor for the science of psi, suggesting that psi phenomena may be difficult to predict and replicate consistently in the same way that weather forecasts are nebulous. The other described his experiences with personal acquaintances whom he considered to be genuine psychics.

These last statements left me rubbing my ears in disbelief. On the one hand, albeit far from perfect, weather forecasts have gotten better over the past few decades and are certainly more reliable than outcome predictions from psi research. On the other hand, befriending individuals who claim psychic abilities is hardly firm grounds for scientific exchange.

Individuals, including intelligent persons, are infamously irrational, and one personal "psi experience" is often more compelling than multiple converging scientific accounts. Social psychologists have coined this phenomenon the "vividness" effect. Being a scientist, a prestidigitator, and a skeptic who is keenly aware of his bellybutton, I'd be curious to see compelling scientific demonstrations of psi (i.e., a string of multiple successful experiments by several independent investigators producing lawful and replicable outcomes). Alas, I have found none to date. But when do you conclude that the effect you are seeking is unlikely? When do you stop looking?

Data in support of psi have so far failed to meet the acceptable scientific standards of lawfulness, replicability, objectivity, falsifiability, and theoretical coherence. A group of dogmatically skeptical individuals seems to consistently reject psi research because of granitic prejudices, but navel-denying skepticism is incongruent with good science. While some scientists may indeed reject psi out of prejudice, they typically do not "discriminate" against psi; they show a similar "prejudice" against any claim that seemingly violates fundamental principles of current scientific theory. A healthy first reaction to any departure from existing frameworks is to look for defects in the supporting evidence. If such defects are not apparent, it is time to insist on obtaining independent replications. Until such evidence is forthcoming, it would be difficult for the scientific community to accept a claim for an anomaly.

Highly biased perceptions of reality may be at odds with the findings of science, and establishing the existence of paranormal phenomena might well comprise an intractable task. If compelling evidence were to materialize, however, scientists should be willing to change their minds. Members of the scientific community should be amenable, at least in some measure, to the possibility of novel phenomena. At the same time, proponents of new claims should provide compelling "proof," and everyone should be sufficiently critical to dismiss claims that already have been found specious. While some of us may have concluded that the Tooth Fairy seems unlikely, others may keep on looking for her. . . . Still others may be undecided.

Note

1. Meeting of Minds. Invitational Workshop on Anomalous Cognition. University of British Columbia, July 15–16, 2007. Supported by grants from the Fetzer Institute, the Samueli Institute, the Bial Foundation, University of British Columbia, and the Institute of Noetic Sciences. □

Anomalous Cognition? A Second Perspective

Challenged by findings of leading parapsychologists that the evidence for anomalous cognition was not repeatable and has otherwise failed to meet scientific standards, participants in a conference on the subject simply ignored the challenge.

RAY HYMAN

In the previous article, Amir Raz provides an interesting and insightful account of the Meeting of the Minds (MoM) conference. His report offers the viewpoint of a young neuroscientist who is newly encountering the world of parapsychology and its claims. I thought I might complement his description with a few comments from my perspective. I have been a critic—I hope a constructive one—of parapsychological claims for fifty years. Together, our two accounts can better convey some of the issues stemming from this meeting.

I was invited to speak as a representative of the skeptical community. As a presenter, I felt my responsibility was to directly address the issues in the statement of the meeting agenda and goals. These issues, as spelled out in advance by the organizers, were:

- to bring together a distinguished set of researchers to consider the state of the evidence for anomalous cognition
- to discuss the methodological and theoretical challenges presented by such phenomena
- to address sociological barriers that have constrained academic discussion of this topic
- to examine the process and potential impact of the meeting.

My attention was captured by the following two quotations from the agenda:

> . . . meta-analyses of several classes of experiments published in peer-reviewed journals suggest that some effects, while small in magnitude, are highly repeatable. . . .
>
> Because of these and other reasons once commonly used to dismiss contemplation of anomalous cognition are becoming increasingly debatable, we believe the time has come to examine the taboo that has constrained serious scientific consideration of this evidence.

The obvious subtext of this meeting statement can be summarized in three propositions:

1. Psi (ESP and Psychokinesis) is real.
2. The evidence for psi is consistent and independently replicable.
3. The time has come for the scientific community to seriously consider the claims for psi.

My presentation directly challenged each of these propositions. I did so by using data and arguments provided by leading figures in parapsychology. I began by considering parapsychological claims of having demonstrated an "anomaly." Since the beginnings of modern science, the scientific community has repeatedly been confronted with claims of anomalies. Some, such as meteorites, discrepancies in the orbit of Uranus, discrepancies in the advancement of Mercury's perihelion, X-rays, and continental drift, eventually were shown not to be the result of mistaken observations or flawed methodology. Furthermore, they were supported by evidence that was consistent and independently verifiable. Given these circumstances, the claims were accepted, and scientific theories were appropriately modified to accommodate them.

Interestingly, some of the defenders of these claims argued that the inconsistencies and failures of replication were properties of the claimed phenomena. The parapsychologists, who now admit that their evidence cannot be replicated, also argue that this failure to replicate is one of the unusual properties of psi!

Other claims, such as those for Martian canals, N-Rays, polywater, mitogenetic radiation, the "discovery" of the planet Vulcan, and cold fusion, were rejected because the evidence was inconsistent and could not be independently replicated. Interestingly, some of the defenders of these claims argued that the inconsistencies and failures of replication were properties of the claimed phenomena. The parapsychologists, who now admit that their evidence cannot be replicated, also argue that this failure to replicate is one of the unusual properties of psi!

I first addressed the apparent inconsistencies in parapsychological claims about the status of the evidence. Some parapsychologists, such as Jessica Utts and Dean Radin, repeatedly declare that the evidence for anomalous cognition is compelling and meets the most rigorous scientific standards of acceptability. Others such as Dick Bierman, Walter Lucadou, J.E.

Ray Hyman is professor emeritus of psychology at the University of Oregon. Hyman's published research has been in such areas as pattern recognition, perception, problem solving, creativity, and related areas of cognition. He has written and published extensively on the psychology of deception and critiques of paranormal and other fringe claims.

Kennedy, and Robert Jahn, openly admit that the evidence for psi is inconsistent, irreproducible, and fails to meet acceptable scientific standards. I quoted Radin's statement in his 1997 book The Conscious Universe that "we are forced to conclude that when psi research is judged by the same standards as any other scientific discipline then the results are as consistent as those observed in the hardest of the hard sciences" (italics in the original). I also quoted from Jessica Utts' 1995 Stargate report that, "Using the standards applied to any other area of science, it is concluded that psychic functioning has been established." Both Radin and Utts were present during my presentation. Neither took this opportunity to retract these claims. I can only assume that they still stand behind these strong assertions.

They want the scientific community to accept their claims without having to pass the usual tests. I pointed out that this was not going to happen. N-Rays, Martian canals, and other claims of anomaly that did not pass these tests occupy the junk heap of discarded science. Why should claims of psi be treated any differently?

I was hoping Radin and Utts would provide an explanation of how they can maintain such a position in the face of mounting evidence and arguments within the parapsychological community that the reality of psi cannot be justified according to accepted scientific standards. Dick Bierman, the Dutch parapsychologist, for example, carefully re-analyzed major meta-analyses of parapsychological research on mentally influencing the fall of dice, the Ganzfeld psi experiments, precognition with ESP cards, psychokinetic influence on RNGs, and mind over matter in biological systems (Bierman 2000). He looked especially at the relationship between effect size and the date when the studies in each of these research areas was conducted.

Bierman fitted a regression line to the data in each area. In all cases, the regression line revealed a consistent trend for the effect sizes to decrease with time and to eventually reach zero.[1] In addition to these linear trends from the meta-analyses, Bierman and other parapsychologists point to dramatic failures of direct attempts to replicate major parapsychological findings. These particular failed replications cannot be dismissed as being due to low power, which is the excuse commonly offered by Utts, Radin, and a few others. Bierman concluded, "In spite of the fact that the evidence is very strong, these correlations are difficult to replicate."

Other major parapsychologists also agree with Bierman's conclusions. Lucadou put it this way, "The usual classical criteria for scientific evidence are effect oriented. Experimental results of parapsychology seem unable to fulfill these requirements. One gets the impression that an erosion of evidence rather than an accumulation of evidence is taking place in parapsychology" (Lucadou 2001). Kennedy put it this way, "Many parapsychological writers have suggested that psi may be capricious or actively evasive. The evidence for this includes the unpredictable, significant reversal of direction for psi effects, the loss of intended psi effects while unintended secondary or internal effects occur, and the pervasive declines in effect for participants, experimenters, and lines of research. Also, attempts to apply psi typically result in a few very impressive cases among a much larger number of unsuccessful results. The term unsustainable is applicable because psi is sometime impressive and reliable, but then becomes actively evasive" (Kennedy 2003).

As the preceding quotations indicate, many leading parapsychologists acknowledge that the existence of psi cannot be demonstrated with evidence that meets currently accepted scientific standards. Most critically, these standards include the essential ingredient that the evidence has to be capable of being reliably reproduced by independent investigators. Lacking this basic ingredient, a claim cannot be considered seriously by the scientific community. Above all, it is this basic standard that has made contemporary science the preeminent—and the only—method for gaining trustworthy knowledge. The parapsychologists who admit that the evidence for psi cannot achieve this standard, however, still believe that psi exists and, in most cases, want the scientific community to take their claim seriously. How can they justify such a position?

My presentation dealt directly with this issue. Again, I was hoping for some sort of explanation or justification of this demand for special treatment. It seems to me that the parapsychologists, especially the organizers of the MoM conference, were pleading for a special exemption from the standard scientific criteria. They want the scientific community to accept their claims without having to pass the usual tests. I pointed out that this was not going to happen. N-Rays, Martian canals, and other claims of anomaly that did not pass these tests occupy the junk heap of discarded science. Why should claims of psi be treated any differently?

Finally, I speculated about what might happen if the parapsychologists, especially the organizers of the conference, achieved their goal of getting the scientific community to take their claims seriously. For example, what if the National Academy of Sciences appointed a committee to examine in detail the current evidence for psi? The committee members would obviously find the same results that the parapsychological community has already uncovered. The effect size for psi, in every major research program in parapsychology, declines over time and reaches zero. Major attempts to directly replicate a key parapsychological finding, even when possessing adequate power, fail. The scientific community, when apprised of these findings, would dismiss the parapsycholog-

ical claims with even more force than they now do. Rather than earning the respect that it seeks, parapsychology's reputation as a serious research program would suffer greatly.

I ended with a quotation from Martin Johnson, a respected parapsychologist of a previous generation:

> I must confess that I have some difficulties in understanding the logic of some parapsychologists when they proclaim the standpoint, that findings within our field have wide-ranging consequences for science in general, and especially for our world picture. It is often implied that the research findings within our field constitute a death blow to materialism. I am puzzled by this claim, since I thought that few people were really so unsophisticated as to mistake our concepts for reality. . . . I believe that we should not make extravagant and, as I see it, unwarranted claims about the wide-ranging consequences of our scattered, undigested, indeed rather 'soft' facts, if we can speak at all about facts within our field. I firmly believe that wide-ranging interpretations based on such scanty data tend to give us, and with some justification, a bad reputation among our colleagues within the more established fields of science.

Johnson wrote those words over thirty years ago. However, they apply with even more force today. In spite of the many new directions that parapsychology has taken since 1976, the only consistent feature of parapsychological evidence is its inconsistency.

As I indicated, I took the organizer's agenda seriously. My presentation dealt directly with each of the issues raised by the organizers: the claim that psi was real and supported by replicable evidence; the implication that the scientific community was unfairly refusing to accept parapsychological claims; and the consequences of having the scientific community seriously consider such claims. I pointed to the apparent contradictions in the claims of the organizers that the evidence for psi was convincing and scientifically warranted and the admission by many contemporary parapsychologists that the evidence for psi does not and cannot meet scientific criteria. I suggested that if, indeed, the organizers succeed in their quest to gain the attention of the scientific community, the result would be a serious blow to the status of parapsychology.

I was expecting serious consideration of my specific challenges to the assumptions of the agenda. I also was expecting that the other presenters and discussants at the conference would deal directly with these issues. I wish I could relay to you how the presenters and the conference attendees responded. Unfortunately, there was a disconnect between the stated agenda and goals and what actually took place. As far as I could tell, I was the only presenter to directly address the issues spelled out in the meeting statement. The majority of presentations were irrelevant to the conference goals. Indeed, several appeared to actively distract from the goals.

The conference organizers and the parapsychologists in attendance failed to respond or even discuss my challenges to the claims in the meeting statement. No one seemed bothered by the contradictions inherent in the claim that the evidence for psi is rock solid or the admissions within the parapsychological community that the evidence for psi is capricious and irreproducible. I have no idea why the conference failed to follow its stated agenda. Perhaps I misunderstood. Maybe the agenda was advanced not as something for discussion but rather as a set of "truths" that were to be presupposed by the participants. I do not know.

What I do know is that although I attempted to put the stated goals of the agenda on the table for debate and discussion, no one seemed eager to do so. What I also know is that the conference agenda implies two requests that the parapsychological community is putting to the scientific community. Both of them are radical and unrealistic. The first request is that the scientific community accept the claim that psi is real. The second is that they do so by exempting parapsychologists from the requirement that they provide evidence according to acceptable scientific standards. Both requests amount to changing science as we know it. Obviously, the scientific community will not, and should not, acquiesce to these requests.

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Note

1. In two cases, Bierman suggests that after reaching zero, the effect size shows signs of increasing again. However, this is questionable and appears to be an artifact of fitting a polynomial to data where the zero effect size has existed for a while. Under such circumstances, a second-degree polynomial will better fit the data than will a linear regression line.

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But You Deceived Me!

The Necessity of Deception in Investigation of the Paranormal

A student concludes that the use of pretext is invaluable in the quest for truth after completing a project in which she put five psychics—unbeknown to them—to the test.

KATHARINE MEROW

I put my mascara on more heavily than usual. Its striking blueness harmonized nicely with the gauzy shirt and the azure luster of the topaz "communication stone" on my left pointer finger. The Birkenstocks seemed a bit out of place, but luckily the almost elephantine pants—twenty-six-inch bells, baby—hid them from all but the most perceptive eye. Surveying my disguise in the mirror, I reviewed the particulars of my fabricated story. Finding every detail satisfactorily ingrained, I tried to relax. I was ready.

Braving the haunts of several suburban psychics pales in comparison with voluntarily interning oneself at the insane asylum on Blackwell's Island, but the intrepid Nellie Bly and I do have something in common: we are both fakes. I am no more an adherent of the burgeoning New Age movement than Nellie was a raving maniac. I do not relish handing over a fifty-dollar bill to someone who is either devious or delusional any more than The New York World reporter enjoyed eating spider-infested bread or bathing in icy water. And just as Nellie Bly couldn't forthrightly inform the callous and negligent nurses that she planned to pen a scathing two-part exposé of the Blackwell's Island establishment, I doubt if an announcement of my ulterior motives would have elicited a favorable response from the paranormal practitioners I visited.

The concealment of relatively inconsequential, immediate, or personal truths—my reasons for consulting a psychic, for example—in order to gain insight into what Yale researcher Stanley Milgram calls "difficult-to-get-at truths" is nothing new (Milgram 1974). Investigative journalists and scientific experimenters alike have long employed this type of deception. Indeed, in these very pages last year, CSI Senior Research Fellow Joe Nickell defended the use of trickery in checking psychic and Spiritualist claims. As a result of their refusal to be tested under meaningful conditions, he said, "they invite surreptitious tests" (Nickell 2007).

In the tradition of Nellie Bly, several more modern researchers feigned the outward signs of schizophrenia to gain admittance to a treatment facility, where they subsequently observed the behavior of staff members and fellow patients (Herrera 2001). In the late nineteenth century, Mark Twain, skeptical of the Victorian "bumpology" craze, assumed a disguise and pseudonym before testing the reliability of the pseudoscience by getting his head "read" by eminent phrenologist Lorenzo Fowler (Lopez 2002). More recently, Milgram, while conducting a study of individuals' obedience to authority, told his subjects that the experiment in which they were participating was designed to examine the effects of punishment on learning. This, of course, was untrue.

Milgram's provocative study, performed in the 1960s, sparked a raging debate regarding the ethicality of deception in research. Many who read accounts of Milgram's procedures expressed horror not at the admittedly alarming results of the study but at the fact "that the experiment was carried out at all" (Milgram 1974). Participants, designated as "teachers," were instructed by an authority figure to read a set of word pairs to a "learner" (an employee of the experimenter), who was to remember them. The teacher then read one word of each pair, expecting the learner to supply the other. If the learner failed to do so, the teacher was to administer a shock, starting at fifteen volts and increasing by fifteen for each additional miss. Commanded to persist with the punishment even when the learner groaned and pleaded, 65 percent of the original forty participants continued to administer shocks until they reached the maximum of 450 volts, the lever for which bore a foreboding "XXX." After each session, Milgram debriefed the subjects, allowing each to converse with the unharmed learner (who, in fact, had received no shocks at all) and explaining that the screams of agony were prerecorded. Despite these precautions and his sponsorship of several follow-up surveys to determine whether participants were traumatized by their laboratory experience (they weren't), Milgram's procedures came under vicious attack. Critics could not ignore the fact that Milgram had cast a shroud of illusion over the eyes of his unsuspecting subjects.

One result of academia's heightened attentiveness to the ethical issues raised by Milgram's study was the 2001 report drafted by the National Bioethics Advisory Commission (NBAC) focusing on the "ethical and policy issues in research involving human participants" (Honaker 2001). Although this document pertains mostly to medical studies in which there exists the possibility of bodily harm, the American Psychological Association (APA) has alerted NBAC about the existence of issues particular to inquiry in the social science disciplines. L. Michael Honaker, APA's chief operating officer, noted, for example, that in "social psychology, deception research is often the only method by which an empirical question can be adequately answered" (Honaker 2001). While the details of protocol have yet to be formalized, psychology textbooks conclude their accounts of the landmark obedience study by assuring wide-eyed students that "today's committees charged with protecting human participants in research would be unlikely to approve Milgram's experiments" (Bernstein and Nash 1999). Gone, then, are the days when scientific investigation could proceed unfettered by endless deliberations behind the closed doors of bureaucratic conference rooms.

Blissfully unaware of the precarious underpinnings of deception research, I fed each of five psychics the same fib. Some I encountered face-to-face; others I engaged only via telephone.

Since completing the senior project alluded to in this article, Katharine Merow graduated from Swarthmore College with a degree in mathematics and linguistics. Merow can be reached via e-mail at kmerow@gmail.com. Special thanks to the Philadelphia Association for Critical Thinking (PhACT) for sponsoring her investigation.

Each employed his or her particular paraphernalia: tarot cards, natal charts, meditative states. Amid all the variation, however, my major concern remained unchanged: I desired information about a deceased sibling that in truth never existed. I plaintively explained to each psychic that my mother had given birth to a child between my older sister and me. My sister, four years my senior, vaguely remembered a pregnancy and birth, but little more. I had approached my parents about this baby, but they steadfastly refused to broach the topic.

Although I was prepared to furnish numerous, more picayune details relating to this fictitious scenario, the psychics seemed to require little or no additional information. Instead of cross-examining me about the facts of my narrative—an interrogation I feared likely to result in the revelation of my scam—the psychics readily supplied the answers I purportedly sought. They all at least told me the gender of my lost sibling—four votes male and one female—and most repeatedly confirmed that the child's death was "nobody's fault." The more confident psychics went as far as suggesting possible first initials and birth months and relating joyous scenes of angels and family reunions in heaven. I pretended to swallow their factoids and assurances, but behind my grieved yet grateful front, I struggled to stifle a giggle.

Since the principal concern in deception research is the balance between the harm suffered by the subjects involved and the greater good likely to result from the study in question, it is important to evaluate the deleterious effects my investigation could conceivably have on the psychics I consulted. The main issue here is confidentiality. I doubt whether my five psychics, all of whom received more than adequate payment for their services (for their inadvertent participation in my informal study, that is), would feel personally affronted if they learned that I had lied to them. They might, however, object to my using their names in print, arguing that I would, with my merciless debunking, cost them valuable business. I bear no ill feelings toward these particular psychics; they are simply the means by which I hope to understand (and perhaps discredit) the psychic phenomenon as a whole.

It is such evaluations of the flourishing psychic industry—telecommunication analysts estimate that the psychic hotlines alone rake in approximately one billion dollars each year (Woodruff 1998)—that have the potential to benefit the public. If my study indicates—as indeed it has on a small scale at least—that real, live, by-appointment psychics (who consider themselves superior to their telephone brethren) authoritatively pontificate about nonexistent deceased siblings, those who hear about it may think twice before shelling out the considerable cash required to receive the counsel of one of the droves of psychics out there, telephone or otherwise. While researchers agonize about subjecting experimental participants to physical or emotional stress, journalists do not hesitate to sacrifice the reputations or financial stability of certain individuals for the sake of the public's disillusionment. Nellie Bly's exposés, for example, doubtlessly caused the discomfort of many: the officials who oversaw a prison where male guards inappropriately searched female prisoners, the bigwigs of an employment agency that cheated immigrants, a New York lobbyist who bribed politicians to secure favorable legislation, and the managers of a health clinic that allowed for unscrupulous experimentation on humans. Their squirming, however, seems well worth the subsequent reforms that resulted, at least in part, from Bly's journalistic undertakings. A critical examination of psychics has the potential to effect some positive change as well.

My study, which includes no statistical analysis (I lacked the funds necessary to acquire a sufficiently large sample size), would perhaps be best classified as a journalistic inquiry. It thus falls into a "non-research" category unrestricted by NBAC's regulations. Still, our society regards falsehood and deception as highly reprehensible and hardly ever (except in instances of polite flattery) justifiable. So the question remains: could I have gained equally reliable insight into the alleged supernatural powers of psychics without assuming the look and manner of a devout New Ager (or without lying to them)? It seems unlikely. Most people, whether claimants of outrageous abilities or not, behave markedly different under scrutiny—a natural reaction. This constraint does not spring from any underhanded intent to mislead the observer. It just happens.

And people who supposedly possess paranormal capabilities seem particularly prone to the negative effects of critical examination. Since the experience of so many phenomena relies not only on the practitioner's undisturbed concentration but also on the rapt beholder's acceptance of the particular event's plausibility, many purveyors of the paranormal refuse (or profess an inability) to demonstrate their aptitude under a judgmental eye. This shortcoming has not escaped notice. As James Randi writes, "psychics do not as a rule perform well in laboratories or indeed in exacting test conditions of any kind" (Randi 1987). Frederick Woodruff, himself a professional astrologer, tarot specialist, and former telephone psychic, admits that psychics' "spirit[s] may be daunted if they feel you are skeptical or cynical" (Woodruff 1998). Jess Stearn, author of numerous books for people of the paranormal persuasion, offers his own excuses, explaining that, "obviously, the subconscious, the source of creative inspiration, cannot shine when conscious thinking—annoyance, elation, anger, fear—distractingly intrudes into a clear channel" (Stearn 1969). To avoid interfering with the psychics' abilities, I dutifully kept my skepticism to myself. For all their proclaimed clairvoyance, not one psychic could penetrate my shoddily constructed veneer.

As it turns out, my deceased sibling falsehood was just as indispensable—and apparently just as undetectable—as my feigned receptiveness toward psychic phenomena. If left to their own devices, psychics volunteer vague statements, most of which are subjective, unverifiable, or open to such broad interpretation as to be practically useless. Their predictions, usually related to distant events—motherhood, career, and marriage in my case—are such that clients are likely to remember them only if they happen to come true. Psychics also indiscriminately parrot back information that their clients supply them, whether intentionally or not. One psychic told me, for example, that he

knew I was "a bit worried about something"—as if I would be consulting a psychic (in good faith, anyway) otherwise. All five psychics launched into lengthy descriptions of my future romantic partners and the many "obstacles" I would no doubt encounter along my chosen path, and all five flattered me with such glowing adjectives as "generous," "kind," "beautiful," and "creative." None of this, of course, is particularly concrete, hence, the necessity of the deceased sibling. If psychics provided details about a fictitious child, I reasoned, I could safely conclude that they were in some way dishonest, either advertising abilities they did not possess or, if they did happen to detect that no such child existed, failing to inform me of my error. Either way, I'd have them.

Dastardly as my deception may have been, then, I suspect that I was not alone in my deceit. If psychics do not have the powers they profess, then they suffer from one of two syndromes. In the first, appallingly immoral individuals swindle emotionally vulnerable clients by dispensing, at outrageous rates, falsely consoling information based on nothing more than keen observation. In the second, perhaps even more alarming, psychics, whether out of wishful thinking or the need to legitimize their profession, engage in self-delusion, convincing themselves that they have some cosmic connection with a higher being, a collective consciousness, or a universal, animating force. Either way, psychics—and indeed many paranormal practitioners—seem to react violently upon discovering that someone has duped them. When a dowser, who had "found" the pyramid he had instructed his audience to visualize, learned that my father had surreptitiously ensured that everyone was concentrating on a sphere instead, his face colored. "But you deceived me!" he screeched, livid. Was my father's deception, aimed at the revelation of the dowser's fraudulence, really as unpardonable as the dowser's, which was committed in the name of self-aggrandizement with the intent to mislead? I vote no.

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THE FALLACY OF MISPLACED RATIONALISM

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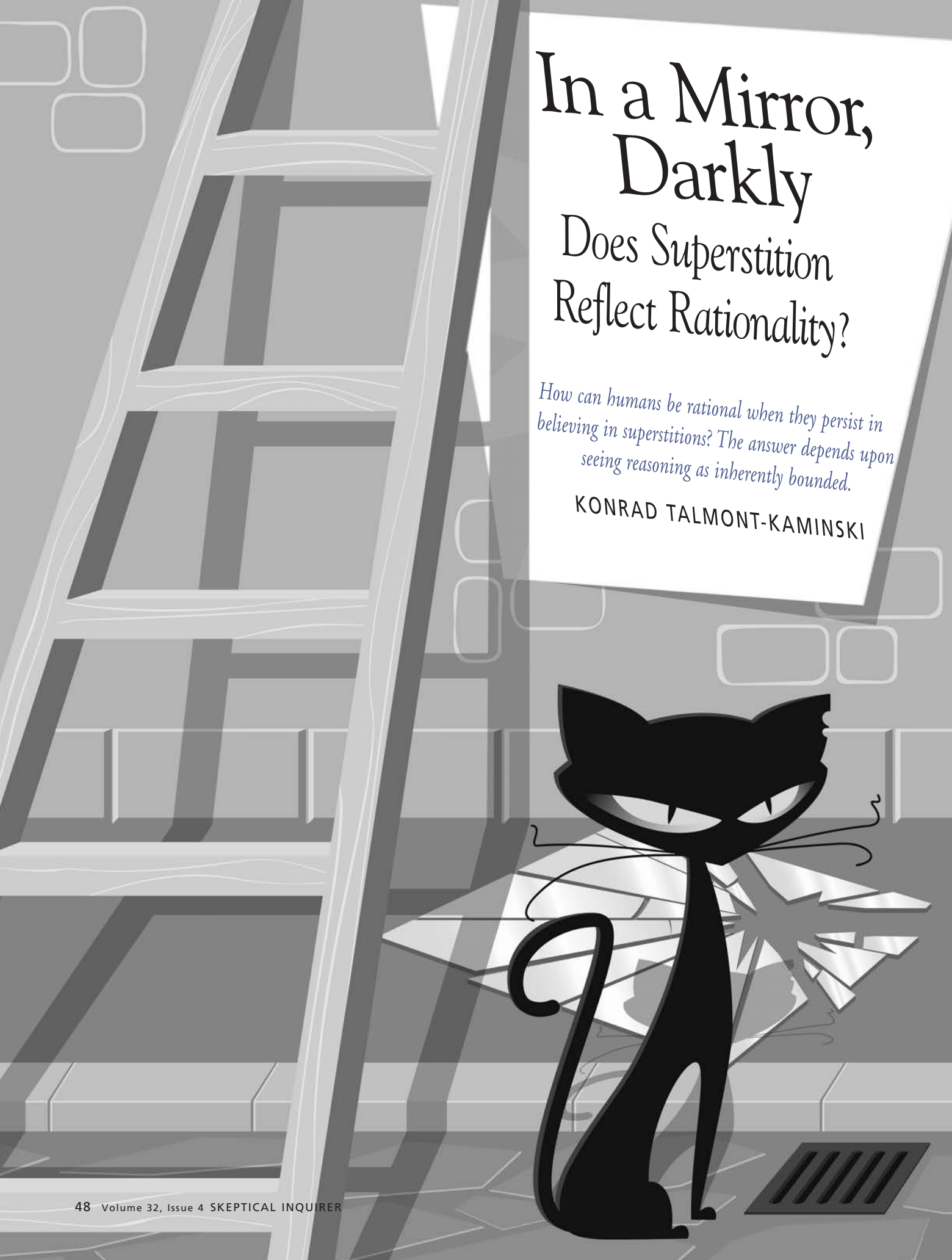
else. But instead, they regale us with rich fables about huge and complex military retrieval operations, hastily erected morgues, draconian, secret arrangements enforced by naked threats, as well as little dead bodies. Such elaborate fables are most likely the result of innocent confusion. Indeed, the very "eyewitness sightings" cited as supporting the crash-dummy hypothesis have been shown to be suspect because of other inconsistencies and are disbelieved even by many Roswell proponents.[1] Even if we accept the Air Force suggestion that the Roswell "witnesses" saw crash dummies during the 1950s and confused that sighting with an alleged saucer crash in the 1940s, that still does not explain the accounts of large-scale, secretive military crash retrieval operations in the desert. Even if the Air Force suggestion was correct, it still would not explain other very bizarre aspects of the accounts. With stories like this, the skeptic must confront the likelihood of self-deception or mendacity (made all the more likely by the fact that the witnesses generally contradict each other on major details). So, while the Air Force investigators thought their "explanation" resolved a problem, they created a new problem in public confidence when an implausible explanation was put forth as an explanation for "observations" (eyewitness reports of little dead bodies) that really were not observations at all but carefully contrived fables.

So, what insight does the skeptic take away from this? Do not neglect Hyman's Categorical Directive: one must ensure, in formulating an explanation, that one does not end up creating a preposterous scenario that is little better than the claimed phenomenon it is supposed to explain. Is the existence of the alleged phenomenon established sufficiently beyond doubt, or is it likely that the alleged phenomenon, as described, is exaggerated, misperceived, or even wholly fabricated? Do we have solid, credible evidence that cries out for an explanation? If not, trying to formulate a rational explanation is actually counterproductive. Before the skeptic expends time, effort, and credibility to come up with an explanation for some alleged phenomenon, he or she needs to be quite certain that there is indeed a phenomenon in need of explanation.

Note

1. The principal Roswell "eyewitness" stories cited as possibly representing dummy-drops were those of Gerald Anderson and the late James Ragsdale. Anderson has been caught fabricating a document to substantiate his story, and even the "Flying Saucer Physicist" Stanton T. Friedman, once one of Anderson's biggest supporters, has publicly disavowed his story. Ragsdale (among other things) signed two different and mutually contradictory affidavits concerning the supposed "crash" that differ on major details, especially concerning the location of the site. The latter affidavit is suspected of being motivated by financial considerations in the promotion of a tourist attraction "landing site" and a book deal (Klass, Skeptics UFO Newsletter #45, May 1997). □



In a Mirror, Darkly

Does Superstition Reflect Rationality?

How can humans be rational when they persist in believing in superstitions? The answer depends upon seeing reasoning as inherently bounded.

KONRAD TALMONT-KAMINSKI

There is a famous description of a superstitious person who begins his day with a ritual: he looks for meaning in dreams, will not stand on a grave, spits to protect himself against evil spirits, and avoids having his path crossed by a weasel. Apart from the bit about the weasel, all these practices sound very familiar to modern ears. However, the characterization originated around 300 B.C. with Theophrastus, the ancient Greek philosopher who succeeded Aristotle as the head of the Peripatetic school. Ill fortune at some stage opted for black cats—a weasel shortage perhaps?

Apart from such changes in the content of individual beliefs, not much has changed since antiquity. Hundreds of surveys carried out across the world show that superstition is doing very well, with espoused belief in superstitious claims outstripping belief in fairly basic scientific claims. For example, a 2005 Gallup poll showed that 41 percent of Americans profess belief in ESP. A similar study conducted in 2006 in Poland by the Public Opinion Research Center showed that 30 percent of Poles claim that star signs affect a person's character. In an earlier European study by Richard Wiseman (2003) in the United Kingdom, 74 percent of respondents claimed they knock on wood for good luck.

In light of the history of many efforts to eradicate it, the continued success of superstition is very surprising. After all, since Theophrastus, superstition has been subject to unremitting attack not just by philosophers but also by scientists. Even if earlier efforts were ineffective, the sustained attacks superstition faced during the Enlightenment should have stamped it out. Yet superstition continues to be common across cultures. Those who have tried to eliminate it have had all the success of those who use their hands to push down the water in the ocean. It is perhaps even more surprising that superstition exists in the first place. After all, long before facing the stern disapproval of science, superstition faced the impartial and pitiless arbitration of evolution. Having superstitious beliefs may, in that context, be compared to having an extra arm that is never used for anything but merely gets in the way—an abomination that seems to have little to do with the survival of the fittest.

Nonetheless, superstition flourishes. Indeed, I claim that it is one of the basic human traits such as the capacity for love, need for shelter, or, perhaps, fondness for puppy dogs. Certainly, I would not claim that I am not superstitious. Despite my best efforts, I think I do have a certain tendency to accept superstitious beliefs and indeed almost definitely do hold such beliefs. While I am not aware of any such beliefs, I would try to expunge them if I recognized them as superstitious.

What is one to think about humans, then? Aristotle defined humans as rational animals, but should we share the pessimism expressed by Russell (1950) when he wrote, "Man is a rational animal—so at least I have been told. Throughout a long life, I have looked diligently for evidence in favor of this statement, but so far I have not had the good fortune to come across it"? Given how we seem to refuse to learn, should we conclude that humans are actually irrational animals?

I think that the twin issues of humanity's apparent irrationality and superstition's inextirpability only appear problematic because we are viewing superstition as traditionally opposed to rationality. I do not mean that it is rational to carry talismans or believe in auras but that the relationship between reason and superstition is more complex and intimate than mere opposition. To understand the problem, it is necessary to look at the traditional ideal of rationality.

The twin issues of humanity's apparent irrationality and superstition's inextirpability only appear problematic because we are viewing superstition as traditionally opposed to rationality.

Rationality was viewed as a regulative ideal—the perfection that people should try to get as close to as they can. As such, rationality is often thought of as consisting of a set of universal principles that are in some sense independent of the messy, real world of actual living individuals. Indeed, traditionally the way that people transcended their limitations was by coming to instantiate those rational principles. This profoundly dualist view can be seen in Descartes's 1641 mind-body distinction or Pascal's 1669 talk of humans as thinking reeds—limited in body but magnificent in mind.

In this view, superstition is simply the very opposite of reason—a failure to transcend limitations emblematic of backwardness and ignorance. One becomes rational by freeing oneself of all of one's superstitions. Refusing to reject superstition when it is exposed is the very paradigm of irrationality. And refusing to reject superstition despite twenty-three centuries of rational

Konrad Talmont-Kaminski is a Fellow of the Konrad Lorenz Institute for Evolution and Cognition Research, Vienna, Austria, and assistant professor at the Institute of Philosophy in the Marie Curie-Sklodowska University, Lublin, Poland. He has worked on developing naturalist approaches in epistemology, philosophy of science, and philosophy of language. His research has focused on various aspects of a naturalized account of rationality, and it is in this context that he is now examining superstition as a natural phenomenon. He may be reached at ktalmont@bacon.umcs.lublin.pl.

criticism must be seen as staggeringly, astoundingly imbecilic.

This view is still very popular. Particularly, I would imagine, among the readers of this publication. Nonetheless, David Hume's 1748 criticism shows that this view of rationality is problematic. Fundamentally, no one has developed a satisfactory set of rational principles, and it now seems that there simply is no such thing. Many viewed this as grounds for moving to a nihilist position in which the use of brute power and brain-washing are all that is left to human interrelations—a likely conclusion if reason is rejected. However, that is not a view that rejection of the traditional account of reason forces upon us, and it certainly is not the view I propose. Instead of rejecting reason, I think phenomena such as superstition force us to look at reason from a more consistently scientific point of view than previously. So, rather than seeing reason as something that brings us closer to the sphere of angels than of apes, reasoning should be investigated as a natural phenomenon, a result of evolutionary change that is a property of finite, biological organisms.

The idea that at least some superstitions are a result of cognitive illusions is attractive because it would explain the very problem that we began with—the persistent ubiquity of superstition.

There are two important sides to this approach to reason.

The first is to place it within an evolutionary context—something begun by Konrad Lorenz in 1977, among others. This has a couple of vital consequences for the way in which reason is to be understood. One is that pragmatic considerations become central—cognition is seen as a means that organisms use to survive in an environment filled with threats and opportunities. The other consequence is that rational progress need not be understood as moving toward some ideal but rather away from ignorance. Indeed, this is what is seen when we look at the spectrum of capabilities that various organisms employ for observing and understanding their environment—from the simple stimulus-seeking responses of sunflowers and paramecia, to the complex interactions of higher animals and the human ability to deal with the world through the use of explicit, conventional symbols that are interrelated by abstract relations.

The other side of a naturalized approach to reason is already partially implied by the first: the capacity for both the gathering of information and for reasoned thought is always bounded—a vital point raised by Herbert Simon in 1956. This means that in the process of evolutionary and scientific development we never wholly transcend all limitations. Instead, progress is to be understood in the step-wise way we manage to reach beyond what was possible earlier. Thus, the capabilities we have at our disposal at no point become applicable universally but rather are appropriate to a range of limited contexts, and we learn how to deal with new contexts by developing new methods that can be applied to them.

Superstition is naturalized similarly to reason. As such, it is to be understood, at least in part, as the result of the workings of an evolved trait. This project is closely related to the project for understanding religious beliefs as a natural phenomenon that Dennett publicized in 2006—the exact connection between them is yet to be determined, of course. It's tempting to look for some way in which superstition contributes to evolutionary fitness. However, the possibility that superstition is an adaptive trait is only one of the many tools that evolutionary theory offers for understanding superstition. Another possibility, which I find far more persuasive, is that superstition is actually a by-product. In other words, while it does not have any adaptive value in itself, it is linked to a trait which is adaptive. In addition, there is no reason that different superstitions have to be explained using just one evolutionary mechanism—it may be that different kinds of superstitions have different evolutionary explanations, only some of them adaptive. Thus, for example, a number of psychologists, including Marjaana Lindeman, are pursuing a cognitive developmental route for explaining superstition (Lindeman and Aarnio 2006).

The thesis that I pursue is that at least some superstitions can be understood as the by-product of an adaptive trait: our limited cognitive capabilities. In other words, I am interested in showing that superstition is actually a by-product of rationality. In particular, superstition may be a result of cognitive illusions.

Cognitive illusions can be understood as analogous to perceptual illusions (though I suspect strongly that the relationship is actually much closer). One often-used example of a cognitive illusion is illustrated when someone is asked what northern European capital lies directly north of the tip of the Italian boot. Without looking at a map most people answer Amsterdam or even Paris. They are very much surprised to hear that the correct answer is actually Vienna. People tend to think that Italy extends directly south from the European landmass, whereas it actually extends in a southeasterly direction. In fact, the only part of the Italian mainland that points directly south is the very tip. The point is that, just as in the case of perception, people tend to make certain standard errors that reveal the way they are thinking in a given situation.

This can also be seen using a second example. Imagine that you live in a city of ten million people, about ten thousand of whom have a particular disease. Imagine, furthermore, that you are randomly chosen to be tested for that disease, a test which is known to have a 5 percent chance of returning a false-positive result. Finally, imagine that the result of your test is positive. Now, without worrying about the exact numbers, try to give a rough estimate of how likely you are to have the disease.

Most people, including scientists, tend to focus on the five percent chance that each test has of returning a false positive. Thus, they either give the answer as ninety five percent or, figuring that the question can't be that simple, they discount it slightly, saying that the correct estimate must be around eighty percent. Generally speaking, very few consider the information about the overall numbers in the population as of anything but secondary significance. Interestingly, however, the situation changes when the same problem is presented slightly differently.

Imagine that you are in a city of ten million people, about ten thousand of whom have a particular disease. Imagine, furthermore, that you are randomly chosen to be tested for that disease, a test which, if taken by all of the healthy residents of your city, would return roughly five hundred thousand false-positive results. Finally, imagine that the result of your test is positive. Now, without worrying about the exact numbers, try to give a rough estimate of how likely you are to have the disease.

At this point, nearly everyone gives the correct answer that the chance of illness is actually only about two percent.

Cognitive illusions were originally discovered in 1974 by Tversky and Kahneman, who said that they are due to the use of simple heuristics that introduce standard biases into human thinking. The problem with this account was closely related to the problem the traditional view of rationality has with the ubiquity of superstition—it failed to explain why human beings use and indeed persist in using biased heuristics. The answer was provided by Gigerenzer, who showed that the heuristics we use are not just simple but also highly effective in the context in which they are normally used (Gigerenzer 1999). Thus, the numerous kinds of disagreements between what statistics indicate and what our heuristics suggest to us is due to us not having, in our evolutionary past, dealt with frequency information in a form similar to percentages. The bias disappears, however, when we represent the same information in a form closer to what the heuristics were designed to cope with—as seen in the example of the medical test. Similarly, in the case of our false intuitions about the position of the Italian peninsula, the error might perhaps be traced to humans not traditionally needing to consider the "as the crow flies" directions to any locale. Thus, cognitive illusions are very much like the optical illusions they are compared to in that, although incorrect, they are the result of making certain rational assumptions about our environment, assumptions that were shown by Hume to be necessary. Not surprisingly, Gigerenzer's work is very much in the bounded rationality tradition begun by Simon—heuristics are effective only in appropriate contexts. To see just how effective they are, it is useful to consider another example.

Consider the following list of pairs of Polish cities and, without checking, try to guess which city is the larger of each pair:

∑ Krakow / Warsaw
∑ Torun / Zielona Gora
∑ Lublin / Lodz
∑ Warsaw / Kolobrzeg
∑ Zielona Gora / Krakow
∑ Torun / Kolobrzeg

To most people not from Poland, many of the names will be unfamiliar. What is interesting is that while this might seem to make the task more difficult, it actually makes it easier, as was shown by Gigerenzer. The reason is that we can use our lack of familiarity with a city's name as an indicator of the size of the city. We are more likely to have heard of the bigger cities, as they more often appear on maps and in the news. In the example given, random choice should lead to an average of three and a half correct guesses. However, when I presented the problem, most people got most of the answers right, these being, in order: Warsaw, Torun, Lodz, Warsaw, Krakow, Torun.

The idea that at least some superstitions are a result of cognitive illusions is attractive because it would explain the very problem that we began with—the persistent ubiquity of superstition. If superstition is caused by the misapplication of heuristics and is innate and highly useful to all people, ridding ourselves of it would require that we give up on the underlying heuristics—something that we are neither capable of nor would be wise to attempt. This does not mean that we can't do anything. Indeed, assuming that the general position is correct, we may end up dealing with superstition more effectively than previously. The vital step will be to identify connections between individual superstitions and the individual heuristics whose misapplication has led to them. Having identified such links, it will be possible to consider very specific measures aimed at counteracting superstitions. The appropriate response will be to identify the circumstances under which the heuristic in question leads to superstition, to learn not to use it in those conditions, and finally, to develop alternative strategies for dealing with such situations.

Recognizing that rationality is bounded cures us of the hubris of thinking that we are fully rational. Instead, we recognize superstition very much as a natural part of us all. Thus, the struggle against superstition in our society and within ourselves will never end.

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Gardnerian Whimsy and Insight, New and Old

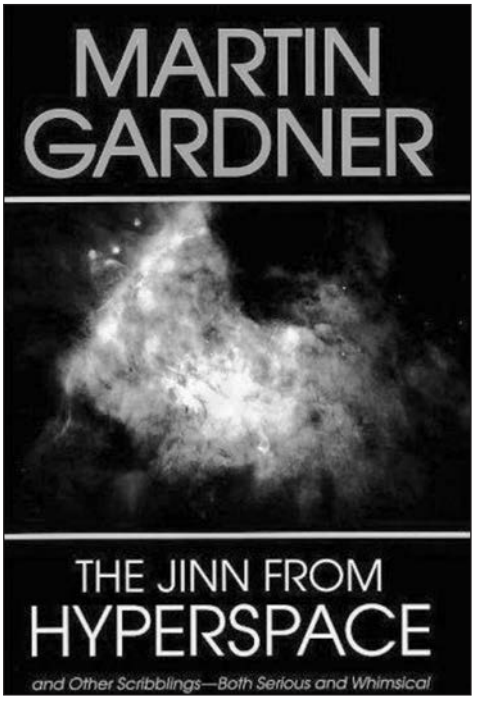
SID DEUTSCH

The Jinn from Hyperspace, and Other Scribblings—Both Serious and Whimsical. By Martin Gardner. Prometheus Books, Amherst, New York, 2008. ISBN 978-59102-565-8. 307 pp. Hardcover, $25.95.

A reviewer should be unbiased. Alas, I admit that I devoured, digested, and was uplifted by Martin Gardner's "Mathematical Games" column in Scientific American from 1956 to 1981, and then by his "Notes of a Fringe Watcher" column in SKEPTICAL INQUIRER from 1983 to 2002. In addition to these columns, Gardner also found time to publish over sixty books.

Gardner, ninety-three, grew up around Tulsa, Oklahoma, and has returned to his roots near Oklahoma City, where he lives in an assisted living facility.

Of The Jinn from Hyperspace, Gardner writes in the preface, "Like my earlier anthologies, this book is a haphazard collection of published (and a few unpublished) writings." Not quite haphazard, the book is broken up into four parts: "Science, Math, and Baloney" (48 percent); "Literature" (17 percent); "L. Frank Baum" (20 percent); and Lewis Carroll (15 percent). "The Jinn from Hyperspace" is the title of the tenth of thirty-six chapters.



Each chapter is reprinted from another book or magazine. Each is introduced by an appropriate paragraph or two. There are illuminating notes at the end of some chapters. Alas, there is no index, so chapter titles have to serve the purpose.

Here is a coarse cross-section of The Jinn from Hyperspace:

In chapters one and two, which appeared in SI in 2006, Gardner discusses False Memory Syndrome. "The False Memory Wars," was an eye-opener about a mental-health scandal, now largely avoided because of revelations such as those by Gardner. This is followed by "The Sad Case of Father Shanley," an essay about a case that sent a priest to jail in 2005. Gardner presents convincing evidence of his innocence.

Chapters three and four discuss the writings of Roger Penrose, an outstanding British mathematical physicist at Oxford University: "Penrose: The Road to Reality" and "Penrose: The Emperor's New Mind." "Penrose opens his mammoth treatise with a vigorous defense of Platonic realism," Gardner says of the first Penrose book. "This is the view of almost all mathematicians and physicists. They take for granted that the objects and theorems of mathematics are timeless truths that have a strange existence independent of human minds and cultures." The review appeared in Criterion in 2004. In the introduction to chapter four, he writes, "Will we ever be able to construct a computer, made with wires and switches, that can do everything a human mind can do? . . . Many artificial intelligence (AI) researchers think these things are not only possible, but may actually be achieved before the end of the century! Sir Roger Penrose thinks this is baloney, and I agree. We belong to a group called the 'mysterians' because we believe neuroscience is nowhere close to understanding consciousness. . . ." Gardner wrote the foreword for Penrose's book.

"The Ars Magna of Ramon Lull" is a reprint of the first chapter from Gardner's book Logic Machines and Diagrams

Sid Deutsch is a Fellow of the Institute of Electrical and Electronics Engineers and the Society for Information Display. He has taught at four universities, been an associate editor of IEEE Transactions on Biomedical Engineering, and written both textbooks and popular books. He is a longtime Committee for Skeptical Inquiry scientific consultant. E-mail: siddeutsch@ieee.org.

(McGraw-Hill 1958). A Spanish theologian and visionary, Ramon Lull lived from about 1235 to 1315. He constructed concentric circles within circles, and each circle was divided into, say, ten sectors. Each sector has an idea or word printed thereon; such as the Ten Commandments. The circles could be individually rotated. With five circles, for example, we can then get 10^5, or 100,000 different combinations. Each combination is a group of five elements that may suggest a meaningful concept. It is the basis for human creativity. With the human consciousness platform examining a string of possible elements, the right combination of elements yields something useful, and we shout "Eureka!" (The writing of this paragraph required four "Eurekas.")

Chapter nine features "A Defense of Platonic Realism," a critical review of Science in the Looking Glass: What Do Scientists Really Know? by E. Brian Davies (Oxford 2003). Gardner writes "Platonism is still used today for what is more often called mathematical realism." The review first appeared in Notices of the AMS, 2005.

Four reprinted articles from Isaac Asimov's Science Fiction Magazine comprise chapters ten through thirteen. "The Jinn from Hyperspace" is from a puzzle column, 1981. It is an entertaining fairy tale about John Collier Fletcher, who "always wanted to be an opera star."

The "Four Letters" referred to in chapter sixteen are letters to the editor that were published:

(1) In the Norman (Oklahoma) Transcript, 2005. "I was surprised to see that you gave so much space to covering Dr. Thomas Sharp's lecture in which he argued that dinosaurs are mentioned 25 times in the Bible."

(2) In the Norman Transcript, 2006. Gardner wrote about an obnoxious television ad, "Head On, apply directly to the forehead."

(3) In Ojai magazine, 2006. "Why is it that The New Yorker cartoons are not funny anymore? Please, will someone explain?"

(4) In the Norman Transcript, 2006. "Rush Limbaugh, on his radio show, is promoting a homeopathic remedy for the common cold. If Rush knew anything about the history and nature of homeopathy he would be much ashamed of this commercial."

"So Long Old Girl" in chapter twenty-four is an ode to the destroyer escort USS Pope, upon which Gardner served until it was decommissioned in 1945. The chapter is prose dressed up to look like poetry—exactly the kind of endeavor that Gardner denounces in the introduction to chapter twenty-three. Nevertheless, I love the "poem," because I was similarly engaged on a destroyer at that time.

Gardner's introductions to six reprints of L. Frank Baum fantasies (in chapters twenty-five to thirty), plus chapter thirty-one that tells how the Oz Club started.

Chapters thirty-two to thirty-six comprise Gardner's introductions to four Lewis Carroll books, plus the last chapter, which is a reprint of his introduction to an edition of Alice's Adventures in Wonderland and Through the Looking Glass, Signet 1960. One can only be amazed that the brain of this superman, Martin Gardner, is able to delve into so many areas—in addition to everything else, he is an authority on Lewis Carroll!

The final chapter, "The Two Alice Books," allows a single paragraph specifically devoted to each of these two books. The remainder of the chapter provides interesting tidbits about Lewis Carroll's life. "There is convincing evidence that Carroll was romantically in love with Alice. . . . There is no question that Carroll's fondness for young girls, and photographing them without clothes, was in his mind a completely innocent admiration of their charms." But this is not the important legacy that Carroll left behind. Gardner ends the chapter with, ". . . I would not consider a person educated who has never read Carroll's Alice books. Among the great characters of imaginative literature, Alice has become as immortal as Don Quixote, Huckleberry Finn, Captain Ahab, Sherlock Holmes, and Dorothy Gale of Kansas. If you are not yet acquainted with Alice's adventures in Wonderland and behind the mirror, read on and enjoy!"

And that's a piece of advice I can apply to the whole of The Jinn from Hyperspace—read on and enjoy!

A reviewer should be unbiased. Alas, I admit that I devoured, digested, and was uplifted by Martin Gardner's "Mathematical Games" column in Scientific American from 1956 to 1981, and then by his "Notes of a Fringe Watcher" column in SKEPTICAL INQUIRER from 1983 to 2002.

Photoghosts: Images of the Spirit Realm?

JOE NICKELL

Ghosts Caught on Film: Photographs of the Paranormal. By Melvyn Willin. David & Charles, Devon, England, 2007. ISBN-13: 978-0-7153-2728-9. 156 pp. Hardcover, $16.99.

Since it was founded in London in 1882, the Society for Psychical Research (SPR) has conducted research into paranormal claims. Its founders' hope was to validate Spiritualist phenomena and so unite science and religion (Guiley 2000, 353). Over the subsequent century and a quarter, the society's archives have amassed an important collection of anomalous photographs that (with other collections such as the Fortean Picture Library) have been tapped for the book Ghosts Caught on Film: Photographs of the Paranormal. The compilation is by Dr. Melvyn Willin, the SPR's Honourable Archive Officer. It is at once an invaluable compendium—a selection of curious paranormal photos, many of which are treated with appropriate skepticism—and an annoying presentation with outright fakes sometimes obfuscated by excessive credulity.

Paranormalities

Willin appropriately debunks such notorious images as the 1917 Cottingley Glen fairy photographs produced by two schoolgirls using obvious cutouts (but fooling the likes of Sir Arthur Conan Doyle) (16–17), and a supposed séance materialization of spirit "Katie King" that is in fact a depiction of the medium Florence Cook posing "in her underwear" (Willin 18–19). He also correctly explains some images—a "Madonna and Child" seen in a fountain's splashing water, the face of a "cherub" gazing from a wedding posy, and the "Virgin Mary" outlined in tree branches (52–57)—as simulacra resulting from our ability to interpret random patterns, like inkblots or clouds, as recognizable pictures. Indeed, a "sacred elephant in the sky" (62–63) is merely a pachyderm-shaped cloud.

Still, Willin is unwilling, it seems, to avoid mystery mongering altogether. For example, he is too uncritical of "aura" photographs, including Kirlian photos (36–37; 12–43; cf. Nickell 2001, 142–149), as well as the allegedly psychically projected "thoughtographs" of Ted Serios (Nickell 1994, 197–198; Randi 1982, 222–227). Willin's main focus (so to speak), as his book's title makes clear, is on ghosts, and the majority of his questioned pictures are of that genre: here a spook, there a specter, elsewhere an apparition or phantom—a ghost (or spirit of the dead) by any other name.

However, it is important to realize that the earliest photographic processes recorded not a single ghost: not the early, impermanent experimental images of J. Nicephore Niepce in the first quarter of the nineteenth century nor the later experiments (1834–39) by Fox Talbot, who produced "fixed" prints on paper. The first practical photographic process, the daguerreotype (after L.J.M. Daguerre), which was announced in 1839, likewise recorded no ghosts. And the same is true of ambrotypes (from 1855) and tintypes (patented in 1856) (Coe 1989, 8–37; Nickell 1994, 4–29, 147–149).

Debut of Spirits

Not until glass-plate negatives came on the scene (about 1859), facilitating double imaging, did "ghosts" begin to appear in photographs. The first such fakes were produced by Boston photographer William H. Mumler. He discovered that when he recycled glass photographic plates, a faint image could remain and so appear as a dim image in subsequent pictures if the glass was not thoroughly cleaned. Spiritualism then being all the rage, Mumler went into business in 1862 as a "spirit photographer," eventually attracting such clients as Mary Todd Lincoln, whose portrait included a "spirit" image of her assassinated husband (22–23). However, Mumler was exposed as a fraud when people recognized that some of the supposed spirits were still among the living (Nickell 1994, 146–159, 192–196).

Nevertheless, "spirit" photography was off and running, later followed—if we make a distinction that Willin does not—by "ghost" photography. The difference? The former began in the studio and moved to include the séance room, the idea being that spirits of the departed were usually conjured up, summoned to appear in order to communicate with the living. In contrast, ghost photographs were typically made at supposedly haunted sites. And whereas spirit photos were invariably charlatans' productions, ghost photos could either be faked or appear inadvertently—as by reflection, accidental double exposure, or the like.

Willin would do well to note that ghost photos began to proliferate after portable cameras became available to amateurs during the 1880s—especially at the end of the decade when George Eastman introduced celluloid roll film for his Kodak camera (Nickell 1994 22–28, 158). Like the earliest spirit photos, those supposedly depicting ghosts showed them to look just like people, only more ethereal. In modern times, that would change when a variety of ghostly forms—such as strands of "ectoplasm" (an imagined spirit substance) or "orbs" (bright balls of "energy")—began to appear in snapshots. The main culprit was the pocket camera with a built-in flash. The burst of light could rebound from the wrist strap to produce the ectoplasmic strands or from

Joe Nickell, PhD, is CSI's Senior Research Fellow and author of numerous investigative books, including Entities and Camera Clues. His Web site is at www.joenickell.com.

dust particles or water droplets to yield orbs or from a wandering fingertip, hair, jewelry, etc., to produce various other shapes or blurs (Nickell 1994, 159).

Photo Analysis

To show how additional facts and analysis can help illuminate many alleged ghost photographs, here are a few from Willin's compendium that are especially deserving of such treatment.

Posing Spirits. A circa 1875 image by the notorious English spirit photographer Frederick Hudson depicts a seated man surrounded by shrouded figures. "Although known to dress up and pose as his own 'ghosts' and to use double exposure for cheating," concedes Willin, "Hudson was ultimately believed to have leavened his frauds with much genuine spirit photography." Reputedly, in this instance the sitter and two friends were permitted to operate the camera without Hudson's interference.

Never mind that Hudson allegedly used a specially gimicked Howell camera; it supposedly held a framed, pre-exposed image that moved into position while the sitter was being photographed (25). There are other inherent indicators that the photograph is bogus. If the extra figures are subtracted from the picture, the composition is unaccountably bad: the sitter is positioned not only off center (being both too far to the right and too low), but also too far away, so as to leave an unusual amount of surrounding space. One can rationalize that the additional space was left to make room for the spirits, but how would they have known just where to place themselves to make a pleasing arrangement? Most likely the chair and camera had been pre-positioned by Hudson, who had already photographed the "spirits." Still another indicator of faking comes from the figures' wearing shrouds. This seems less a convincing attire for ghosts than a suspiciously dramatic convention (as Willin himself notes in the following case).

Haunted Doorway. A figure, shrouded head-to-toe and appearing semi-transparently before the doorway of a thatched-roof building, was supposedly photographed in the 1920s. However, the image did not surface until 1993, and its place of origin is only assumed to be "probably England." Willin admits that "most people are suspicious of the dramatic drapery" since the majority of ghost sightings look like "real people in real clothes" (146–147). Yet he adds: "One day, technology could well tell us this apparition is exactly what it seems to be: a genuine paranormal presence."

What it really seems to be is a staged ghost photo. There is a well-known technique for producing such fakes that does not require any tampering with the negative or other darkroom deception. It was used by some spirit photographers: while the sitter remained motionless for the lengthy exposure, a confederate—suitably attired—simply appeared briefly behind the unwitting person, the result being a photo with a semi-transparent "spirit" (Nickell 1994, 152). The same effect can be produced accidentally when someone steps briefly into or out of a scene that is photographed with a long exposure (Nickell 1994, 158–159). Several other photos published by Willin may be of this type, as he himself somewhat grudgingly admits (e.g., 76–77, 86–87, 116–117, 132–133, 144–145).

Specter on the Stairs. A famous 1936 photograph of a too-good-to-be-true ghostly figure on a staircase was made at Raynham Hall in Norfolk, England, by a pair of reporters who claimed first to see the apparition and then to quickly take a picture of it. Willin sits on the fence—or is it the banister?—on this one, acknowledging that "there appear to be inconsistencies in the photo on the stair rail," while insisting that the negative appeared to be "genuine" and there was "a tradition of haunting" at the house (128–129). He adds, "Let the viewer decide."

And so expert viewers have. A careful examination of the photograph (in much greater enlargement than given in Willin's book) shows evidence of double exposure. "For example," note John Fairley and Simon Welfare in Arthur C. Clarke's Chronicles of the Strange and Mysterious (1987, 140), "there is a pale line above each stair-tread, indicating that one picture has been superimposed over the other; a patch of reflected light at the top of the right-hand banister appears twice." What likely happened is that the camera was shifted slightly during a long, two-stage exposure, one with a real figure briefly standing on the stairs. Hence, the negative would be unaltered. Photo expert Tom Flynn (2008) agrees with this assessment and cites clear evidence that the photo was not flash-illuminated but shot with available light, thus requiring a long exposure. This gives away the lie of the reporters' claim of having made a quick snapshot.

Spirit of "Old Nanna." A 1991 photo depicts a little boy who seems to be gazing up at a bright vortex of mist that intrudes into the photo. But is he really looking at the spirit of Old Nanna, his late great grandmother, as family members have suggested? Unfortunately, no one in the room at the time the picture was snapped perceived anything out of the ordinary. Although acknowledging that "there is not enough verifiable fact to support the appearance and photographing of a spirit," Willin cautions: "If the picture is fraudulent then the misty cloud should be explainable but it's far too big and dense to be, say, cigarette smoke. Neither is there anything to suggest a human form but, of course, what the boy saw and what we are permitted to see could be quite different" (20–21).

Ironically, the effect is clearly due to something that Willin is well aware of—acknowledging elsewhere (72) how frequently the "camera-strap syndrome" can cause just such an anomaly. He fails to recognize it in this instance even though it has the classic appearance produced by an unsecured strap getting in front of the lens. The braiding of the strap is even evident, an effect I have captured in experimental photographs (Nickell 1996, 13–14).

Palatial Apparition. At Middlesex, England's famed Hampton Court

Palace, on October 7, 2003, surveillance-camera footage captured a spooky, robed figure emerging from open fire doors. Alarms sounded on three occasions, but each time the doors were found closed. Although Willin cites the opinion of skeptic Richard Wiseman that the figure is likely a person in a costume, he ends by wondering, ". . . could this be the genuine image of an apparition on film, one of the most rare things in the world?" (142–143).

I had studied the photograph for SI magazine (Nickell 2004) and similarly determined that the image probably depicted an actual person. Examining a high-resolution electronic copy of the photo, I found a clearly solid figure accompanied by shadow patterns that are consistent with a real, human figure appearing in ambient light. The picture thus contrasts with most traditional "ghost" photos that depict transparent, ethereal figures. I suggested that although the footage might be unaltered, the actual event could well have been staged—as suggested by the repeated opening and closing of the doors and the fact that the incidents occurred during the pre-Halloween season.

These are only a few examples from Willin's compendium. Many others could be noted. Time and again, a spooky picture can best be explained by invoking Occam's razor—the rule that the simplest tenable explanation (the one requiring the fewest assumptions) is preferred. And so, other anomalous photos are likewise attributable to such factors as deliberate hoaxing, reflections, rebounding flash, defects of camera or film, simulacra, and other factors—not of another world, but of this one.

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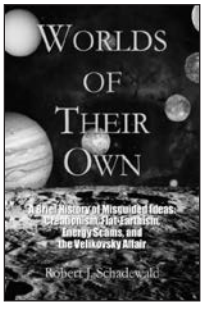
Randi, James. 1982. Flim Flam: Psychics, ESP, ideas that superficially seem plausible but on closer examination are internally contradictory or counter to what is possible in the real world. The term has been applied to circle-squarers, perpetual motionists, and those who believe the Earth is flat. Sometimes the term "fringe science" is used.

We must admit that in the history of science, some of the early "accepted" ideas would, if judged by the standards of today's science, qualify as pseudoscientific: astrology, alchemy, geocentric solar system models, the luminiferous ether. So how do we distinguish science from pseudoscience?

Bob Schadewald had a continuing interest in fringe science and pseudoscience. This posthumous collection of his published and unpublished materials (skillfully edited by Schadewald's sister Lois) is a highly readable account of several varieties of pseudoscience, including Flat Earth theories, perpetual motion, creationism, and predictions of the end of the world. The unifying theme is "fringe thinkers" who create their own versions of reality, contemptuous of the models of nature accepted by established mainstream science. Schadewald treats his subjects with respect and even sympathy (he knew many of them personally), but he clearly reveals why their ideas are flawed and misguided.

Here you will find the stories of colorful characters such as Immanuel Velikovsky, who rewrote the book on solar system astronomy; Charles Johnson, who was certain that Earth was as flat as a pancake; John Keely, who claimed he could tap etheric energy to power a freight train coast-to-coast on a gallon of water; and assorted creationists, who freely engaged in "lying for God."

One might suppose that these folks and their worldviews have little in common. Surely one who believes the Earth is flat and one who believes it is hollow cannot think alike. But, as this book reveals, they have more in common with each other than they do with mainstream science. Looming large in their thinking and their motivations was a literal belief in the King James Bible. Velikovsky used biblical sources freely. Flat earthers' beliefs were bound up with fundamentalist religious beliefs. Creationists and flat earthers have



Pseudoscientists and Their Worlds

DONALD SIMANEK

Worlds of Their Own: A Brief History of Misguided Ideas: Creationism, Flat-Earthism, Energy Scams, and the Velikovsky Affair. By Robert Schadewald. Xlibris, 2008. ISBN 978-1-4363-0435-1. 272 pp. Paper, $19.99; hard-

Donald Simanek is an emeritus professor of physics at Lock Haven University of Pennsylvania. His Web site www.lhup.edu/~dsimanek includes science, pseudoscience, humor, and satire. He can be reached at dsimanek@lhup.edu.

The word pseudoscience is a bit slippery. It suggests something "fake" or "fraudulent"—something that is not a science but pretends to be. We can easily name some of the classic examples: astrology, phrenology, homeopathy, parapsychology, and creationism. People who promote such pseudosciences have been called "paradoxers," because they propose

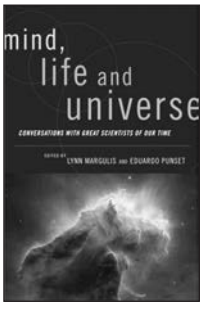
common historical roots, and I don't know of a single perpetual motionist who was not also a religious fundamentalist. The flat earthers were united in their contempt for the idea of gravitational force. To them, it was a sufficient explanation to observe that "things fall because they are heavy." Even here we find a parallel to Velikovsky, whose 1950 book Worlds in Collision and three subsequent books made much of electromagnetic interactions between planets and comets while dismissing gravity as nonexistent or relatively unimportant.

Velikovsky supposed that a comet was ejected from Jupiter, went careening around the solar system brushing Earth and Mars, and finally settled down to become the planet Venus. In several passes of Earth it managed to cause the walls of Jericho to tumble, interrupted Earth's rotation (making the Sun appear to stand still for Joshua), caused the plagues of Egypt, the parting of the Red Sea, and miscellaneous other seemingly miraculous events of recorded history. Few who read these books realized that Velikovsky had published a little-known pamphlet Cosmos without Gravitation (1946) in which he declared "The moon does not 'fall,' attracted to Earth from an assumed inertial motion along a straight line, nor is the phenomena of objects falling in the terrestrial atmosphere comparable to the 'falling effect' in the movement of the moon, a conjecture which is the basic element of the Newtonian theory of gravitation." Velikovsky clearly rejected Newtonian gravity, replacing it with electromagnetic interactions.

Bob Schadewald recognized that some pseudosciences are relatively harmless, but he considered the creationists a serious threat to the integrity of science because of their political campaign to inject their religiously motivated philosophy into public-school science courses. For this reason he attended creationist conferences (calling them "great entertainment") to see what they were up to and was on friendly terms with many of the prominent creationist spokesmen. But at the same time, he helped found the National Center for Science Education and served on its board. This organization is on the front lines in the battle to preserve the integrity of science in the schools against the efforts of creationists to redefine science to include the supernatural.

This book can be enjoyed on several levels, for Schadewald writes with droll humor, and many of his characters have comic dimensions. Included are his interviews with Immanuel Velikovsky and flat-earther Charles Johnson. Here is the story of naturalist Alfred Russell Wallace, who in 1870 unwisely accepted a wager with flat-earther John Hampden on the flatness of the water in the Old Bedford Canal. John Worrell Keely's story was fodder for late-nineteenth-century journalists, who delighted in reporting on his antics promoting machines that ran on etheric energy. Keely was a clever showman who kept his Keely Motor Company going for twenty-six years without producing a single product or paying a dividend to his wealthy investors. Nor did he reveal his secrets.

Concluding chapters on "The Philosophy of Pseudoscience" explore the common characteristics of these independent thinkers. This is an informative and entertaining book of continuing relevance, for pseudoscientific ideas of this sort never die but are continually reborn in new clothing.



Broadening Our Scientific Horizons

KENNETH W. KRAUSE

Mind, Life, and Universe: Conversations With Great Scientists of Our Time. Edited by Lynn Margulis and Eduardo Punset. Chelsea Green, White River Junction, Vermont, 2007. ISBN 978-1-933392-61-5. 358 pp.

Celebrity, much like a winning argument, results more commonly from simple popularity than from merit. Perversely, nothing draws a crowd quite like a crowd. For whatever unfortunate reasons, then, people continue to take their moral and intellectual cues from even the most grossly underqualified sources—television and cinema personalities and institutional and scriptural religious authorities, most egregiously. This was certainly not what E. O. Wilson had in mind in the 1970s when he declared it high time that such questions be wrested from the miserly grips of the philosophers. Science—defined broadly enough to accommodate disciplined, empirical approaches to the so-called humanities—has proven itself uniquely adapted to both the penetration and resolution of even the most sensitive, ancient, and universal issues, especially in recent years.

But the further great minds advance, the more ordinary people they leave behind. Which is precisely why, in Mind, Life, and Universe, editors Lynn Margulis and Eduardo Punset have gathered together thirty-six unrivaled thinkers—perhaps the most accomplished and celebrated experts in their respective fields—for brief, casual interviews on everything from the science of beauty and happiness to the varied and much anticipated promises of the CERN proton smasher. Margulis, elected to the U.S. National Academy of Sciences in 1983, is widely renowned for her Gaia hypothesis (which views

Kenneth W. Krause is science columnist for the Humanist and books editor for Secular Nation. He has recently contributed to SKEPTICAL INQUIRER, Free Inquiry, Skeptic, Truth Seeker, Freethought Today, Wisconsin Lawyer, and Wisconsin Political Scientist as well. He may be contacted at krausekc@msn.com.

Earth as a cooperative superorganism) and the related theory of evolution by symbiogenesis (whereby species interactions result in integrations). She remains powerfully silent throughout most of the book, only injecting an occasional technical caveat or otherwise cautionary instruction, while Punset, director/producer of Redes, a popular weekly science TV series for a Spanish-speaking audience, conducts the interviews with appropriate dexterity and restraint.

No new ground is broken here, but the text is saturated with a refreshing air of earthy sensibility. Presumably, each of us will at some point be haunted by the specter of personal inadequacy as we gaze slack-jawed at countless reports and predictions of exploding technological sophistication beyond our wildest dreams and nightmares. Oxford biologist Richard Dawkins, long-famous proponent of the gene- (as opposed to organism-) centered view of natural selection, confronts the problem and offers yet another intuitive, "Hey, why didn't I think of that?" explanation.

The malaise, it turns out, is a natural consequence of the extenuated lag between biological and cultural evolution. While our slowly shifting genomes (Dawkins dubs them "genetic books of the dead") still embody survival plans for the long-gone environs of the African Stone Age, technology progresses at times by relatively unfettered leaps and bounds. Any radical modification to our environment, including its cultural component, is a potential threat to our survival. That minor mental pathologies and feelings of alienation emerge so commonly, Dawkins argues, should actually be seen as a hopeful testament to our species' resilience. In any case, the general lesson to be learned here is that to truly understand human behavior, we must, at the very least, engage the inextricable spheres of both natural history and molecular biology.

So too might we reassess our approach to the persistently thorny problems of degenerative disease and aging. Why do our cells age in the first place? Tom Kirkwood, professor of medicine and co-director of the Institute for Ageing and Health at the University of Newcastle, instructs once again that we should scrutinize the question from the gene's perspective. Although one could argue that reproductive or germ cells are immortal, given that their sole evolutionary purpose is to transmit their double helix from one generation to the next, body or soma cells routinely grow old and die. Of course soma regenerate from time to time and, at least in theory, can be maintained in perpetuity. But both regeneration and maintenance involve costly investments of energy and, from the genome's point of view, are completely fruitless expenditures at that. Genes have absolutely no use for organisms, after all, once they have succeeded in preserving them beyond their prime reproductive and nurturing years.

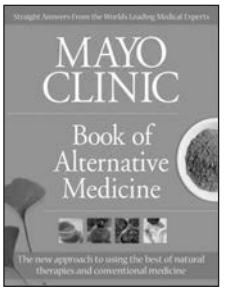
Even so, Kirkwood denies the "great fallacy" that there exists a biological limit to life. He points out that some species live longer than others, that human life expectancies have increased over the decades, and that certain soma—brain cells in particular—last longer than others. As individuals, we can do much to thwart our genes' self-centered designs. To prevent harmful mutations, we can avoid poisonous habits and environments. To facilitate cell maintenance, we can consume smaller portions and steer clear of excessive fat and sugar.

As a broader community, however, we can accomplish a great deal more—so says Douglas Wallace, professor of molecular genetics and director of the Center for Molecular and Mitochondrial Medicine at the University of California, Irvine. Forget the nucleus and the human genome for a moment and instead consider mitochondria, their cellular cytoplasmic neighbors. Once free-living bacteria, mitochondria have since evolved into a symbiotic association with germ cells and soma, consuming the body's toxic oxygen and contributing ATP, the energy molecule, in return.

That sounds like a pretty sweet deal for the cell, and for the most part it is. Unfortunately, though, like fossil fuel-fired power plants, mitochondria are somewhat inefficient, producing dangerous waste by-products called "free" oxygen radicals. Infamous for annihilating whatever crosses their paths—proteins, cell membranes, and human DNA included—free radicals will eventually destroy their host cells. Equally endearing is the mitochondrial tendency to commit programmed suicide by apoptosis.

Vitamin C, vitamin E, and carotene can reduce the lethal effects of free radicals, but to eliminate them and to prevent degenerative diseases commonly thought to be caused by damaged mitochondria—Alzheimer's, diabetes, certain heart and kidney disorders, and even blindness and deafness, for example—we might consider a less exclusive, nucleus-centered approach to cellular medicine. With sufficient funding, Wallace urges, we could develop drugs capable of continuously, or catalytically, reducing oxygen contamination, finally mounting an earnest and vanguard defense against some of the most pernicious maladies people tend to experience as they age.

Despite the fortunate fact that science is largely responsible for the existence of innumerable everyday necessities and conveniences—everything from heart medications and life-saving imaging techniques to the internal combustion engine and the plumbing beneath your kitchen sink—even the world's most prolific living scientists have failed to produce anything close to household names. While most Americans are abundantly familiar with Susan Sarandon, Oprah Winfrey, George Clooney, and so on, they remain completely alien to the likes of Robert Sapolsky, Lisa Randall, and even E. O. Wilson. Nevertheless, tall stacks of relaxed, eclectic yet serious science books—much like this one—are published for the general reading public each and every year. So here lies still another opportunity to broaden our personal and collective horizons. What are the stakes? Arguably, our minds, our lives, and our universe(s).



The Beginner's Guide to 'Holistic' Wellness

DIMITRY ROTSTEIN

Mayo Clinic Book of Alternative Medicine. By The Mayo Clinic. Time Inc. Home Entertainment Books, New York, 2007. ISBN: 1-933405-92-9. 192 pp. Hardcover, $24.95.

The Mayo Clinic Book of Alternative Medicine is the most significant publication of the Mayo Clinic Complementary and Integrative Medicine Program's team, which has been studying various forms of complementary and alternative medicine (CAM, for short) since 2001. Here you will find nothing but reliable and easy-to-understand information from the world's leading medical experts about the ways of integrating CAM into your life and treatments for a truly holistic approach to health and wellness. Readers are informed that CAM is becoming accepted by the medical community and an increasing number of once "fringe" practices are being incorporated into conventional medicine. The book describes twenty-five so-called "alternative therapies" and fifty-nine commonly used herbs, vitamins, and minerals, the majority of which are recommended by the authors for treating hundreds of medical conditions.

A typical SI reader should feel a kind of resentment at this point. The word "holistic" alone, which appears throughout the book (often sans quotes), is enough to make many skeptics scoff. On the other hand, the Mayo Clinic is a respected medical institution, and all of the nine authors have real medical degrees and back up their claims with scientific evidence, so the book cannot be dismissed out of hand. Does this mean that perhaps we skeptics have been unfair to "alternative medicine" and that there is more to it than just placebo, self-delusion, quackery, or, at best, some outdated healing techniques? Perhaps not.

Dimitry Rotstein is a graduate physics student who became a self-styled investigator of "alternative medicine" after being duped by its practitioners one time too many. E-mail: dmrotstein@gmail.com.

True, of the twenty-five CAM therapies, fourteen are recommended as safe and effective for "treating" various diseases. However, a closer look reveals that the word treatment commonly denotes only a temporary relief of some generic symptoms. Moreover, about 90 percent of the symptoms mentioned in the book can be classified in just six categories: pain (mostly nonspecific pain), nausea, stress, anxiety, depression, and high blood pressure. The remaining 10 percent include, among other things, insomnia, bad mood, and lack of concentration. It doesn't take a doctor to realize that all these symptoms have a strong psychological factor, which makes them highly susceptible to the placebo effect. Therefore, only double-blind studies can tell whether these "therapies" have any real effect. However, for each of the fourteen therapies, such studies are very difficult if not impossible to design.

In any case, none of the twenty-five is shown to cure, prevent, or even significantly affect any organic disease—with perhaps just two exceptions. One is massage therapy, claimed to stimulate the immune system in HIV positive patients (p. 117). Ironically, a more recent study suggests that increased immune activity actually speeds up the development of AIDS. Another is spirituality, for which the book proclaims that "some studies of people with cancer report a change in the progression of the disease when prayer was used" (p. 98). For such a bold statement, the evidence is pretty weak, however. There are very few studies on personal prayer (none are double-blind, of course), and their results are mixed even for treating purely psychological symptoms. More disturbing is the fact that the book doesn't make a distinction between personal and intercessory prayer, even though the latter is known to have no effect according to well-designed studies (including one by the Mayo Clinic itself). None of these facts is ever mentioned. In summary, the evidence of the effectiveness of these "therapies" against any real disease is either dubious or non-existent. Of course, controlling such factors as stress and depression is important for your health, but there is no indication that any of the twenty-five treatments (many of which can be quite expensive) are better at it than simple relaxation or minor life-style changes.

Not surprisingly, herbs and supplements fare better. After all, chemistry is chemistry. However, of the twenty-seven recommended supplements, only eight show the potential of treating or preventing anything more serious than superficial symptoms, and all of them appear to be less effective than conventional treatments. Only arthritis pain is said to be treated just as effectively with herbs as with medications, but the effect becomes significant only after a month. That doesn't sound too encouraging.

But what of the claim that alternative practices are being incorporated into conventional medicine? Well, the book gives only one unambiguous example for this: chiropractic treatment for mild lower back pain is said to be "no longer considered alternative" (p. 122). However, all the other sources, including the Mayo Clinic's own Web site and even this very book (p. 143), still list chiropractic treatment for lower back pain under "complementary and alternative." "Busted," a relentless skeptic would exclaim, but wait—the authors

prudently explain that "complementary" and "alternative" are two different things (p. 10), so the above statement is still technically correct.

While the book contains nothing but the truth, the authors display a clear preference for CAM, trying to draw a rosier picture than warranted by the available data. That's quite illuminating if you think about it. The authors can hardly be accused of being too skeptical. They even entertain the possibility that acupuncture and the like work via "putative life energies" unknown to science (pp. 105, 110, 119). And yet, not even a single cure for anything is offered, not a single viable alternative to existing conventional treatments. Perhaps it's an indication that being "open-minded" isn't enough to prove the amazing purported effectiveness of "alternative medicine."

But, if you aren't a skeptic, fear not—the book isn't a total loss. It does describe one "therapy" that can treat and prevent hundreds of medical conditions, even "slow the aging process" (p. 24), and no skeptic will be able to debunk it. This miraculous panacea is However, just because something is difficult doesn't mean we shouldn't try.

Physics for the People

DANIEL GRASSAM

The Social Atom: Why the Rich Get Richer, Cheaters Get Caught, and Your Neighbor Usually Looks Like You. By Mark Buchanan. Bloomsbury USA, New York, 2007. ISBN 978-1596910133. 256 pp. Hardcover, $24.95.

"Think patterns, not people" is the central idea of The Social Atom and the type of thinking that Mark Buchanan believes will bring us greater understanding of social phenomena. From pedestrian traffic flows to the humiliation of Iraqi prisoners by American soldiers, it is not the behavior of the individual but the patterns of individual behavior that will give us insight into why events unfold the way that they do. The biggest barrier to thinking "patterns not people" is getting past what Buchanan terms "the human problem," which basically stated is the belief that social science is complicated because people are complicated, and the unending variability of individuals makes it nigh impossible to perform predictions about a group that will "do things that make the human world unpredictable—if even just to prove it is unpredictable."

Daniel Grassam writes from Auckland, New Zealand. E-mail: daniel@simonpure.co.nz.

According to Buchanan, most social-science research relies more on arguments and plausible stories than on finding patterns. Because of this tendency, it could be regarded as "largely a 'storytelling' science." He elaborates, "It is hard to find any example of social research of the recipe for good science as illustrated by Brahe, Kepler, and Newton," that is, to "gather data, identify patterns, then find a mechanism to explain them." Buchanan doesn't think that all current social science is worthless, just that it is not being approached with the same rigor as other sciences, and that needs to change.

Enter physics. Although treated as an exact science, "the strength of physics always rests on the art of making approximations." Buchanan believes that social science should learn, like physics, "to ignore details that don't really matter, and to focus only on those that do." Using this method will help social scientists see the patterns of human behavior and hopefully allow them to take the next step and find the mechanisms to explain them. Buchanan discusses in detail some of the work that has already been done along these lines.

One of the most practical of these was for the State of Illinois. It used computer modeling to simulate what would happen when the state deregulated its electricity market. (Illinois wanted to avoid the mistakes of California's deregulation that resulted in the misappropriation of billions of public dollars.) The model used agents to represent consumers and regulators with each agent using a strategy to achieve the best results for itself—for a consumer to pay the least amount possible and for regulators to get the best profit. During the simulation, agents were able to learn and adopt new strategies to improve their performance. What the model identified was that some agents were able to manipulate the system to create pocket monopolies, something the state definitely wanted to avoid. This information gave the State of Illinois a greater understanding of the likely outcomes of its deregulation, which could be used to improve its deregulation rollout.

To Buchanan, the success of this model was in its approximations. The model ignored the complexity (and supposed unpredictability) of individual consumers and regulators and focused on what mattered: the strategies that each agent would use in pursuit of its goals and the continual search for better strategies.

In addition to computer modeling, Buchanan also relates studies on existing social science data that have highlighted some interestingly universal patterns called power laws. A study of the five million commercial enterprises in the United States revealed that the number of companies with sales X is proportional to $1/X^2$, which means that there are four times as many companies with sales of $1 million as there are with $2 million. Another power law appears when those same entities are examined on rate of growth.

The distribution of wealth, long known to follow the Pareto, or 80/20,

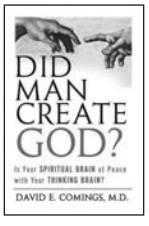
principle, is also subject to a power law. Each time wealth goes up by a factor of 10, there is a decrease in the number of people by a factor of six; thus, for every person with a net worth of $10 million there are about six with $1 million. Does this pattern confirm the existence of a conspiracy of the wealthy elite or deny it? That point is still debatable, but this new information provides new perspectives and new ways of thinking about an old problem.

Is there a natural law to the distribution of wealth or a law of collective entities? This is one of the underlying questions in The Social Atom. Can we find the human behavioral equivalent to the laws of thermodynamics? Buchanan thinks it is possible. "If nature follows patterns that flow out of natural laws, shouldn't we?" Whether social science can join the hard sciences is an interesting topic to consider. The Social Atom provides a compelling argument that it can. □

NEW BOOKS

Listing does not preclude future review.

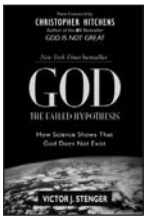
APOCALYPSE: Earthquakes, Archaeology, and the Wrath of God. Amos Nur, with Dawn Burgess. Princeton University Press, New Jersey, 2008. 324 pp. Hardcover, $26.95. The distinguished Stanford University earth scientist and professor of geophysics Amos Nur explores how earthquakes in the distant past helped lead to abandoned cities and extinct civilizations. He combines knowledge of the earth sciences and archaeology to show how earthquakes influenced the distant past and had social, political, and economic repercussions that affected later societies. The most popular and spectacular sites in human history have succumbed repeatedly to seismic damage, among them Jericho, Troy, Mycenae, Petra, Knossos, Humran, Luxor, and so on. Many catastrophes commonly attributed to acts of God are instead due to earthquakes, Nur argues. Surprisingly, although this seems a common-sense idea, it has received stiff opposition. Archaeologists aren't fond of geophysicists entering their domain; some other notable scholars tend to blame excesses of human societies for their own downfalls. Nur examines the evidence that, in many famous cases, earthquakes were involved. — K.F.



DID MAN CREATE GOD? Is Your Spiritual Brain at Peace with Your Thinking Brain? David E. Comings, MD. Hope Press, Duarte, California, 2008. 694 pp. Hardcover, $29.95, softcover, $24.95. In a major and welcome work, a noted physician and researcher in genetics, neuroscience, and the biology and psychology of human behavior applies scientific research and the scientific perspective to religion, specifically asking not, "is there a god?" but a different question amenable to scientific inquiry: is man himself responsible for formulating the entity of an anthropomorphic God? If so (and he believes the answer is yes), then perhaps, he says, religious people can adjust their beliefs enough to make peace with their rational brain. The first three of the book's seven sections are Evolution, Intelligent Answers to Intelligent Design (timely and well worth reading just in itself), and Cosmology. The next three are on the biology, genetics, and evolution of the rational and spiritual brain. The final is on other aspects of spirituality and religion. — K.F.

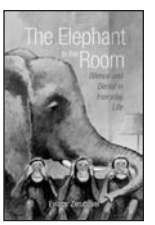
LABORATORIES OF FAITH: Mesmerism, Spiritism, and Occultism in Modern France. John Warne Monroe. Cornell University Press, Ithaca, New York, 2008. 304 pp. Hardcover, $35. Most inquiries into the history of spiritism and occultism focus on America and England. This one, by an assistant professor of history at Iowa State University, looks at France. Monroe tells the interconnected story of three movements—Mesmerism, spiritism, and occultism—as a history of alternative religious practices in France in the second half of the nineteenth and beginning of the twentieth centuries. He says adherents were attempting to "modernize" faith by providing empirical support for metaphysical concepts. These heterodox movements had a powerful attraction by seeming to resolve "an intensely felt intellectual and emotional dissonance—a crisis of factuality in religious life." — K.F.

New in Paperback:



GOD: THE FAILED HYPOTHESIS: How Science Shows That God Does Not Exist. Victor J. Stenger. New foreword by Christopher Hitchens. Prometheus Books, Amherst, New York, 2008. 302 pp. Softcover, $17.95. Physicist (and Skeptical Briefs columnist) Victor Stenger's book, highly touted by Richard Dawkins and Sam Harris, among others, made the New York Times bestseller list in hardcover. Stenger argues that if God exists, some evidence of that existence should be detectable by scientific means. He comprehensively evaluates that evidence and concludes beyond a reasonable doubt that the universe and life appear exactly as we might expect if there were no God. The new foreword by Christopher Hitchens is lively and well informed. — K.F.

SCIENCE AND NONBELIEF. Taner Edis, with a new preface by the author. Prometheus Books, Amherst, New York, 2008. 283 pp. Softcover, $18.95. Edis provides a readable and nontechnical summary of the leading scientific ideas that impinge upon religious belief in the areas of modern physics and cosmology, cognitive and brain science, and evolutionary biology. He shows how science provides natural explanations for the widespread belief in the supernatural and addresses the political context of debates over science and nonbelief. — K.F.



The Elephant in the Room: Silence and Denial in Everyday Life by Eviatar Zerubavel. Oxford University Press, New York, 2008. 162 pp. Softcover, $14.95. The Elephant in the Room examines a simple but often overlooked question: how do you explain the phenomenon of mass denial? What explains the cognitive ability for people to profess ignorance of things that are otherwise obvious? How can tens of thousands of Bigfoot enthusiasts be absolutely convinced that the huge, humanoid creature is out there, despite nary a trace of physical evidence? How did the world manage to ignore the genocidal slaughter of nearly one million people in Rwanda just over a decade ago? Why did the flaws in the Bush administration's claims that Iraq had weapons of mass destruction receive so little scrutiny? Eviatar Zerubavel (a professor of sociology at Rutgers University and author of several books, including The Fine Line: Making Distinctions in Everyday Life) examines the cognitive and social processes that allow groups of people to ignore important information that is disconfirming or simply uncomfortable, and he shows that conspiracies of silence exist throughout society. The book is an excellent complement to titles such as Sissela Bok's book Secrets: On the Ethics of Concealment and Revelation. — B.R.

For the Record

I misstated a subtitle in a book listed in the March/April 2008 New Books column. Cornelius J. Troost's book is titled Apes or Angels? Darwin, Dover, Human Nature, and Race. — K.F.

—Kendrick Frazier and Benjamin Radford □

The Idene: An Early Appearance of the Meme's Meme(s)?

RALPH H. LUTTS

Efforts to identify the mechanisms of cultural evolution are not new. Nor are efforts to establish analogies between biological and cultural processes. Richard Dawkins' work on the meme is among the most recent of these.

At the beginning of the twentieth century, for example, anthropologist Alfred Kroeber coined the term "superorganic" for this sphere of human evolution (Kroeber 1917). He was struck by instances of simultaneous scientific discoveries by different scientists. Kroeber argued that patterns of social change are driven on a large-scale cultural level, with individuals playing little direct role in the process. Although he believed that there are universal patterns of social change, Kroeber was unable to establish a foundation of empirical evidence in support of his position. Indeed, he argued that the social sciences would never achieve the theoretical equivalent of Darwinian evolution (Harris 326–336).

Dawkins clearly disagrees with this position, arguing that memes are analogous to genes. As Susan Blackmore explained, "Dawkins invented the term to refer to a cultural replicator; that is, to information that is copied from person to person or person to artifact. This information (whether ideas, skills, habits, or stories) varies, and the variant forms are subject to selection, so this counts as a replicator" (Blackmore 2008). In short, we have cultural evolution through the social selection of memes.

The basic concept of the meme is remarkably similar to that of the idene, which was developed earlier by psychologist Henry A. Murray. Hudson Hoagland recalled that "Murray coined the term idene in relation to social evolution as an analog to gene in biological evolution" (Hoagland 1964, 111). Murray discussed his concept of the idene during an American Academy of Arts and Sciences conference. Hoagland organized the conference and was president of the Academy at the time. Portions of the conference were published in the summer 1961 theme issue of Daedalus, "Evolution and Man's Progress." Unfortunately, Murray's text about idenes was deleted during the editorial process (Hoagland 1972).

Hoagland included a discussion of idenes in a 1964 article that was published in the journal Science. "There is environmental selectivity to favor not only the rare gene mutation responsible for biological progress," he wrote, "but also social environmental selectivity to favor new ideas contributing to social progress. . . . Thus, ideas and the institutions they generate may be considered related to social evolution as genes and their phenotypes are related to biological evolution, and selective processes operate on them" (Hoagland 1964, 111). Hoagland's Science article credited Murray with coining the term and widely disseminated the idene concept within the scientific community. It also stimulated a lively round of responses from the journal's readers (Letters 1964).

I am not arguing that Dawkins was aware of the idene when, a decade later, he proposed the meme and described it in his book The Selfish Gene (1976). As Kroeber pointed out, it is not unusual for two or more people to make the same or similar discoveries. Dawkins, Blackmore, and others have given the meme concept greater depth and richness than Murray and Hoagland were able to give the idene. However, we should acknowledge their earlier contributions, because knowing the history of the meme may help us gain a greater understanding of how it works.

Ralph H. Lutts is a historian and coordinator of a graduate concentration in environmental studies at Goddard College. He is author of The Nature Fakers: Wildlife, Science & Sentiment (2001) and editor of The Wild Animal Story (1998). E-mail: rhlutts@swva.net.

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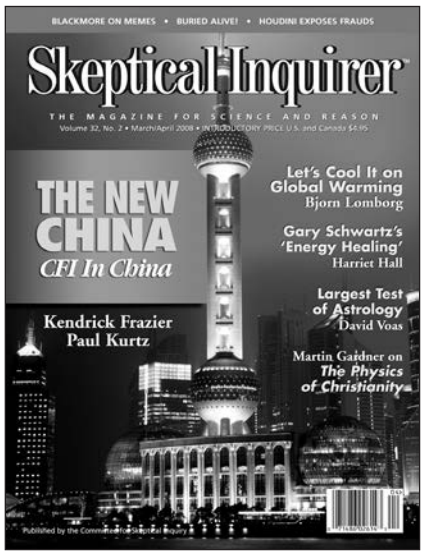
Richard Dawkins Replies

I was not aware of Henry A. Murray's "idene," but I did know of an even older coining, the "mneme" from Richard Semon's book of that name, published in English in 1921 by George Allen and Unwin, London, from a German original, Die Mneme, published by Wilhelm Engelmann, 1904. I should explain that when I wrote The Selfish Gene, I was not aware of The Mneme. It was called to my attention by Sir Peter Medawar in his (marvelous) review of my book. □


BLACKMORE ON MEMES • BURIED ALIVE! • HOUDINI EXPOSES FRAUDS
Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON
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THE NEW CHINA
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The New China . . . and More

For someone devoted to free inquiry and skeptical inquiry "in every area of human interest," Paul Kurtz shows little support for the former and little capability for the latter in "The New China and the Old" (March/April 2008).

Kurtz tells the reader that while China's government "may be authoritarian, it is not totalitarian," but he never discusses the extent of Chinese censorship or the serious consequences facing Chinese citizens who try to engage in free, skeptical inquiry and criticism concerning their government's policies and actions—harassment, arrest, imprisonment.

He also observes, apparently approvingly, that China can do something that "other capitalist countries cannot"—"use the power of the State" to reconstruct a large section of Beijing for the Olympic Games." Kurtz turns a blind eye to the approximately one million residents forcibly evicted, some portion of which are now homeless. Nor does he express any concern that those to be relocated "enjoy the right of appeal or protest concerning the level of compensation set by the state [while] those who do object risk imprisonment" (Arch Puddington, "China Games," Commentary, November 2007).

Kurtz also worries, "[will] the diplomatic policies of the current regime be supplanted by hostile confrontations in the future?" Does Kurtz believe that the regime's current policies—its continued occupation of Tibet, its repeated threats against democratic Taiwan, its enabling of Kim Jong-Il's dictatorship, its obstruction with regard to proposals of U.N. action to halt genocide in Sudan, and its refusal to support serious sanctions against Iran—are worth preserving?

Jeffrey T. Richardson
jtrichel@ca.rr.com

It is sometimes pertinent to remind the editors of SKEPTICAL INQUIRER magazine that they represent scientific skepticism and not just any sort of skepticism. That is, the skepticism we should find within these pages ought to err on the side of science and critical thinking. Two essays published in the March/April 2008 edition seem to indicate the editors had other notions of skepticism in mind.

The most obvious is the Bjorn Lomborg essay, "Let's Keep Our Cool about Global Warming." The editors argue up front that Lomborg's essay was published to placate the global warming deniers who have recently written letters critiquing SI's essays on the anthropogenic greenhouse effects. But it must be clear to the editors that so-called "environmental skeptics" like Lomborg are not scientific skeptics; they err on the side of pseudoscience or politics rather than science. Publishing an unchallenged essay by Lomborg is rather like publishing an unchallenged "skeptical" essay by Michael Behe, perhaps called "Let's Not Monkey Around about Darwinian Evolution."

The other article's blunder is less obvious. The long centerpiece essay by Paul Kurtz on China has much that can be praised. Kurtz does a wonderful job bringing the scientific energy of today's China to his readers. Where he blunders, however, is when he talks about the so-called contradiction of Chinese capitalism and communism. First, the "Communist Party" in China is neither communist nor relevant beyond its attempt to keep state capitalism alive (of which it is losing ground to private capitalists).

More important, the government in China cannot even be seen as a state/party socialist government the way Mao's China was, because the country today obeys a different authority, the so-called "free market." My point is that Kurtz's hand-wringing about the rampant poverty in China—where there are over a hundred billionaires while the average income is less than $1,000 a year—will neither be solved by the Communist-only-in-name Party nor the market.

Kurtz's blind, unscientific analysis of China's move to capitalism isn't nearly skeptical enough of just what capitalism will do to the Chinese (or the rest of us), for it is capitalism itself that has led to the global warming crises Lomborg denies as well as all sorts of inequities via neoliberal globalization.

Barry F. Seidman
Executive Producer,
Equal Time for
Freethought
Bfs1227@aol.com

I just wanted to get this short note off to say how much I liked the most recent issue of SI. I thought Kendrick Frazier's article, "China Gone Modern," was most interesting and perceptive. I also thought his comments were balanced, an uncommon aspect of reports about other places and cultures.

More important, I wanted to say that the article by Bjorn Lomborg was an appropriate article for the magazine. Global warming is a science issue, and much of the debate about it has been based on poor science, in some cases pseudoscience. So this is a legitimate topic for SI. But the topic is complex and the Lomborg article gives us another view of the "big picture." Giving the readers a chance to digest Lomborg's view provides balance to your coverage of the topic.

Michael Dennett
Federal Way, Washington

More on Lomborg and Climate Change

It seems to me that any group calling itself "skeptical" would be especially fastidious about the depth of its research and analysis of an issue. "Let's Keep Our Cool about Global Warming" (SI, March/April 2008) not only fails miserably, but it's an obvious "not to worry" panegyric in favor of inaction. Bjorn Lomborg, an economist and business professor, displays an obvious conflict of interest.

Lomborg says we must consider both carbon emissions and economics. Setting aside this apples-oranges juxtaposition, in our current system, upwards of 90 percent of world trade is in currency and debt-based "securities," a situation that creates enormous instability. Manufactured goods are designed for the quickest trip possible from extraction to landfill at huge environmental costs. Food

production and distribution are extremely wasteful not to mention unsustainable. The entire system depends upon the myth of an unlimited supply of fossil fuels.

Investments in alternate energy and on greater energy efficiency will benefit the environment and our economy as well as improve quality of life and move us toward a sustainable human presence on this finite Earth.

Lomborg would have us believe that the only consequence of the continued rise in Earth's temperature will be a rise in sea levels of about one foot. Land loss, he says, would therefore be minimal, and most nations "will establish maximal coastal protection." He doesn't say how this will be accomplished—but it's cost will be "less than 0.1 percent GDP and approach 100 percent protection." Any skeptics in the house?

He urges that we be "realistic." Our Earth has taken billions of years to reach the finely balanced state into which we humans have been fortunate enough to have evolved, and our activities increasingly impact that balance. Scientists gain new evidence every day of changes in that balance, and rising sea levels are probably the least important.

Scientists see increasingly rapid disappearance of ice sheets and melting of glaciers, tropical diseases sickening people in temperate areas, disruption of migration patterns, birds arriving at their breeding grounds before the caterpillars on which they feed have hatched, dead zones in our oceans, and changes in habitat, biodiversity, and fish stocks and spawning activity.

How will these changes affect us humans? WE DON'T KNOW! And we need to be wise enough to be skeptical of others who don't know either.

L.M. Arndt
San Rafael, California

Lomborg argues that we should continue to allegedly use fossil fuels to grow the world's economies. Lomborg points out that fossil fuels are crucial to grow food cheaply, provide needed electricity, and limit deforestation, and that therefore we don't want to move too quickly to limit carbon emissions. He admits we should use some of the proceeds from that economic growth to increase spending on research into alternative energy sources and on coastal protection.

Lomborg is correct that fossil fuels are crucial to what we think of as a normal lifestyle, which is a high-energy one. If we want to increase economic growth around the world, it's going to be very, very difficult without lots of fossil fuels. The problem? There just aren't enough fossil fuels available to keep on growing the economies of the world's nations. The cheap, easy-to-produce oil, gas, and coal are already burnt or vanishing fast. Fossil fuels are the product of millions of years' worth of stored sunlight. When they're gone, they're gone. Speeding up drilling and mining now will only speed up depletion. Sooner or later the world—including the U.S.—will be making a transition to a low-energy lifestyle.

We can either make reducing energy use and limiting human population the first priority of our economy now while we still have some fossil fuels left to build what we need, or we can do it later when we don't have a choice. . . .

Paula L. Craig
Falls Church, Virginia

Schwartz's Energy Healing

Harriet Hall is to be commended for her article "Gary Schwartz's Energy Healing Experiments: The Emperor's New Clothes?" (March/April 2008). She reminds us of nine-year-old Emily Rosa's well-designed science experiment which demonstrates the nakedness of therapeutic-touch practitioners' claims.

Human energy fields are but one of many quack energy claims both human, such as psi and auras, and non-human, such as those found in crystals, pyramids, and astral influences. These claims are as numerous and diverse as psychics' imaginations.

We recently learned of a new German fad, Edelstein Wasser (precious stone water). One buys a number of semiprecious stones (rose quartz, amethyst, etc.) and puts them in a pitcher of water. The stones infuse the water with "earth energy" which is allegedly beneficial to drink. On a recent visit to Germany, my wife was offered some and reported it tasted like "old, room-temperature water." The stones give off "earth energy" indefinitely. I think the sellers made a marketing mistake by saying the effect of the stones lasts indefinitely, since the market will eventually become saturated. If they said that the "energy" has a half-life of a few weeks or months, they would benefit from repeat customers. (For more information, Google "Edelstein Wasser.")

This German fad of drinking stone water may sound rather foolish and naïve to our ears, but it is relatively benign and pales in comparison to a current American fad. Rather than drinking inexpensive tap water, we spend hundreds of millions of dollars on bottled "spring" water and trash the environment with hundreds of millions of the empty plastic bottles.

David W. Briggs
Marion, Massachusetts

I enjoyed reading Harriet Hall's article on Gary Schwartz and her accurate analogy of Schwartz to the emperor in Hans Christian Anderson's story. To me, an interesting and crucial point is usually missed when the analogy is used. After the Emperor realizes he has no clothes on, he and his royal court continue with the charade. This is vital to keep from losing their power as intelligent leaders and, more important, from losing their income from gullible followers. Might it also apply to other leaders who preach/teach myths and pseudoscience as realities?

Teresa Olivas
Bayard, New Mexico

On Not Indoctrinating Children

In reference to Kendrick Frazier's comment in the March/April 2008 SKEPTICAL INQUIRER ("Dennett: Teach Children All the Facts About their Religion, page 33), I wish to point out that Unitarian Universalists agree wholeheartedly with Professor Daniel Dennett that children should not be indoctrinated "into the religious beliefs of their parents."

As I'm quite sure Professor Dennett knows, Unitarian and Universalist (and, since 1961, Unitarian Universalist) religious societies have been teaching children about other religions for more than fifty years. They teach their students about Unitarian Universalism as well and give them opportunities and encouragement to formulate and articulate their own religious beliefs. And I have noticed much more recently that even our neighborhood Catholic church is giving its children the opportunity to at least visit other religious societies.

Furthermore, as reported in the February 26, 2008, Boston Globe, the recently

released findings of a study by the Pew Forum on Religion and Public Life reveals that "44 percent of American adults have left the denomination of their childhood for another denomination, another faith, or no faith at all." Apparently whatever indoctrination there is doesn't work very well.

Reverend Judy Deutsch
Unitarian Universalist
Minister Emerita
Sudbury, Massachusetts

Premature Burials

I enjoyed Joe Nickell's article on premature burials ("Entombed Alive," March/April 2008). He didn't mention the flurry of patents in the same late-1800s time period in the field of coffin alarms. A quick search of class/subclass 27/31 in the U.S. Patent office shows at least sixteen patents in this rather specialized grouping whose purpose is to indicate ". . . life in persons supposed to be dead." Apparently the fear of being buried alive was strong enough, and the technology to invent alarms was then advanced enough, for inventors to devote time to the effort. Many patents, though, never see the light of day in the marketplace, and I suspect that was the case with many of these inventions, too.

Raoul Drapeau
Vienna, Virginia

Scrutiny of Prophets Not for SI

I have been an avid fan of your magazine for over two years, having read every issue cover to cover. And as a pro-science evangelical minister, I have used many articles as "teaching tools" to enlighten colleagues and congregants. In this regard, I believe—as you do—that the way to break through the anti-science or science-ignorant mindset of many believers is through education and engagement and not through condescension and name-calling.

Thus, I was saddened to see the two lead News and Comment articles in your March/April issue, "The Comic Pratfalls of Richard Roberts" and "Born Again, Inc.: Senate Investigating Six Prophets for Profit." Neither of these articles has one iota to do with science, or even with science-based skepticism, which is your raison d'etre. They were instead gratuitous, anti-religious attacks that have no place in a magazine of your caliber and focus and are exactly the kind of unnecessarily inflammatory material that will cause believers—even those who may be open to education and engagement—to simply ignore the remainder of your important, informational, and instructive articles.

If SKEPTICAL INQUIRER is broadening its focus to include general news reporting that has little or nothing to do with science, that would be a mistake. If it is not, then articles of this type, no matter how true or even "deserved," have absolutely no place in it, as they do nothing to add to the desired science-based conversation with believers and in fact only serve to alienate them even further.

Rev. Ian Alterman
New York, NY

What's the Fuss About GM Foods?

I especially liked the March/April SKEPTICAL INQUIRER because it provided me with an excuse to air something that I'm rather confused about.

In your News and Comment section on page 11, there was a blurb about the controversy over genetically modified maize. I am seeing more and more notices on GM foods at my local health food store, and it has become a selling point that this or that product has been manufactured with "no GM sources."

What's the big deal? Humans have selectively bred everything from cattle, horses, insects (such as honeybees), fish, dogs, any number of vegetables, and so on for perhaps 10,000 years (in the case of certain crops) or, perhaps, even 40,000 years if we consider dogs. Doesn't this count as genetic modification? What's the difference between modifying a plant's genome with selective breeding or modifying it with biochemistry in the lab? If the natural world hasn't completely collapsed with all of the selective breeding that has been implemented by man for 40,000 years, then why do we have all this hoopla about things like GM maize?

Kevin Levites
West Palm Beach, Florida

Science, Art Inform Each Other

Please, let us not establish these separate "magisteria" excluding science and the scientific method from certain aspects of reality as Stephen J. Gould proposed for religion and, in an aside, as another magisterium, "art and the meaning of beauty." This appears to be what Massimo Pigliucci is suggesting in his critique of E.O. Wilson's Consilience: The Unity of Knowledge (March/April 2008).

I am an art historian. In my experience, a whole range of justifiable truths about art and the experience of art are available through the application of the scientific method. I would hate to have anything in the universe off limits for scientific investigation. Or, if something is declared off limits, it should not be done by fiat but should be justified by a reasoned argument based on specific observations. See particularly how Richard Dawkins, in The God Delusion, deals with Gould's thesis of religion and science as separate magisteria. Pigliucci may not like abstract art, something I have studied extensively and am quite moved by. Many people do not like evolution. That these could be matters of personal taste is beside the point.

James K. Kettlewell
Saratoga Springs, New York

Does This Add Up?

Benjamin Radford's short piece focusing on the disappearance of a pair of elderly women in Ohio ("Bad Journalism Misleads Public about Psychics," March/April 2008) was both entertaining and correct about the willing gullibility of the news media. I'm afraid, however, that he failed to give proper credit to one helper who had what any believer in psychic powers would see as a direct hit. As Radford notes, "One supposed psychic said that the numbers forty-two and twenty-seven were significant and would help police find the missing women." The psychic was clearly correct: 42 + 27 + 2 (the number of missing women) = 71!! All the police needed to do was search near Highway 71 for, say, 100 miles in either direction from the retirement home, and they would have found the bodies. When he heard where the women were found, the psychic doubtless jumped to his feet and yelled "Nailed it!"

William H. Hinkle
Tulsa, Oklahoma

The Physics of Christianity

Many thanks to Martin Gardner for his review of Tipler's nonsense (The Physics of Christianity) in SI (March/April 2008). While entirely accurate so far as I see, his adjacent treatment of two topics risks readers confusing two distinct doctrines, which are probably similarly confused by Tipler and are, through my own personal polling, confused by devout Catholics as well.

As a recovering Catholic (it's a lifelong problem) with some knowledge nonetheless, let me clarify that there are two distinct doctrines, those of the Virgin Birth (VB) and the Immaculate Conception (IC). VB relates to Mary the mother of Jesus as having been impregnated by God through the Holy Ghost. IC relates to the independent notion that Mary herself was conceived (presumably through normal means) without Original Sin. Most people, even the devout, believe that IC=VB, when they are not the same and don't even relate to the same pregnancy.

While these doctrines, as most others, have undergone significant debate over the centuries, they are usually official when the Pope says so. These are probably (for VB) Martin I (649, Lateran Council) and (for IC) Sixtus IV (1476). This authority is reminiscent of Richard Nixon's declaration: "when the President says it, it's legal."

John Schmitt
Merritt Island, Florida

Martin Gardner's entertaining review of Frank Tipler's The Physics of Christianity missed one absurdity. If Jesus' birth were due to parthenogenesis, he(?) would have been female. Parthenogenesis could, however, explain the Immaculate Conception. Well, one out of two ain't bad.

Stuart O. Landry, professor emeritus
Department of Biology
State University of New York,
Binghamton

Snake Oil Science

Speaking from the perspective of a layman who has been studying quackery for more that thirty years, I state without reservation that Bausell's book Snake Oil Science (March/April 2008) is the most important book I've yet to read on this subject. (My introduction to quackery came from a now out-of-print volume by Ronald Deutsch, The New Nuts Among the Berries, a work that I still recommend heartily to anyone interested enough to track it down.)

Bausell's writing is accessible to any reader who is willing to devote more than a casual glance at it, and his dry humor is good for quite a few chuckles at the expense of pseudoscientists everywhere. I have especially recommended it to a columnist at the Chicago Tribune who is billed as a "health and fitness reporter" yet is a serious supporter of voodoo healthcare philosophies and modalities. People like her, who promulgate untenable information to the public, are the ones who can reap the most benefit from the book.

Kurt Youngmann
tgobbi@comcast.net

Science Not Self-Correcting?

In his review (March/April 2008) of Petto and Godfrey's Scientists Confront Intelligent Design and Creationism (illustrated by SI, unfortunately, with the 1984 book to which it is an update), Kenneth W. Krause quotes, or perhaps paraphrases, J. Michael Plavcan as saying that "true science is inherently self-correcting."

I am professionally neither a psychologist nor an economist, but what I know of those sciences makes me question the plausibility of that statement. In fact, I wonder if this doesn't qualify as what the late, great Carl Sagan would call an extraordinary claim, requiring equally extraordinary evidence. It seems to me that any human enterprise should be presumed to be subject to systemic biases based on the system of reinforcers (to a psychologist) or incentives (to an economist) that is in place, and the assertion that "true science" is an exception deserves very close scrutiny.

Rich Homa
Menomonie, Wisconsin

Thank You, SI

I am a graduate student in engineering at the University of Toronto. Three years ago I read an issue of the SKEPTICAL INQUIRER in a nearby library.

While I am a Christian—and hold a good handful of beliefs and perspectives that your writers (and readers) would surely hold in contempt—I'm writing this brief letter of appreciation because this magazine compelled me to do the research that led to my rejection of creationism and acceptance of evolutionary theory.

I believe many in the scientific community forget how intuitively nonsensical the theory seems to an outsider, and because it is so well documented, they make few attempts to defend it—thank you for doing so.

Steve Mah
Toronto, Ontario

I am a recent subscriber to the SKEPTICAL INQUIRER, and predict that I will be a longtime subscriber.

I am just saying thank you to all the investigators and reporters that work with CSI and CFI to provide us with this magazine. In a world where seeing and hearing are not necessarily to be trusted, I am very grateful for a publication that "sets the record straight" on a lot of issues that have been boggling my mind.

Jeff Panchuk
Edmonton, Alberta

For the Record

The middle name of Edgar Allan Poe was misspelled in "Entombed Alive" in the March/

The letters column is a forum for views on matters raised in previous issues. Letters should be no longer than 225 words. Due to the volume of letters we receive, not all can be published. Send letters as e-mail text (not as attachments) to letters@csicop.org. In the subject line, provide an informative identification, e.g.: "Letter re: Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122, or fax it to 505-828-2080.

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United States

ALABAMA. Alabama Skeptics, Alabama. Emory Kimbrough. Tel.: 205-759-2624. 3550 Watermelon Road, Apt. 28A, Northport, AL 35476 US.

ARIZONA. Tucson Skeptics Inc. Tucson, AZ. James McGaha. E-mail: JMCGAHA@PimaCC.Pima.EDU. 5100 N. Sabino Foothills Dr., Tucson, AZ 85715 US. Phoenix Skeptics, Phoenix, AZ. Michael Stackpole, P.O. Box 60333, Phoenix, AZ 85082 US.

CALIFORNIA. Sacramento Organization for Rational Thinking (SORT) Sacramento, CA. Ray Spangen-burg, co-founder. Tel.: 916-978-0321; e-mail: kitray@quiknet.com. PO Box 2215, Carmichael, CA 95609-2215 US. www.quiknet.com/~kitray/index1.html. Bay Area Skeptics (BAS) San Francisco—Bay Area. Tully McCarroll, Chair. Tel.: 415 927-1548; e-mail: tullyann@pacbell.net. PO Box 2443 Castro Valley, CA 94546-0443 US. www.BASkeptics.org. Independent Investigations Group (IIG), Center for Inquiry–West, 4773 Hollywood Blvd, Los Angeles, CA 90027 Tel.; 323-666-9797 ext. 159; Web site:www.iigwest.com. Sacramento Skeptics Society, Sacramento. Terry Sandbek, President. 4300 Auburn Blvd. Suite 206, Sacramento CA 95841. Tel.: 916 489-1774. E-mail: terry@sandbek.com. San Diego Association for Rational Inquiry (SDARI) President: Paul Wenger. Tel.: 858-292-5635. Program/general information 619-421-5844. Web site: www.sdari.org. Postal address: PO Box 623, La Jolla, CA 92038-0623.

COLORADO. The Denver Skeptics Meetup Group. Elaine Gilman, President. Skype address: elaine.gilman. 965 S. Miller Street, 302, Lakewood, CO 80226. Web site: http://skeptics.meetup.com/131/.

CONNECTICUT. New England Skeptical Society (NESS) New England. Steven Novella M.D., President. Tel.: 203-281-6277; e-mail: board@theness.com. 64 Cobblestone Dr., Hamden, CT 06518 US. www.theness.com.

D.C./MARYLAND. National Capital Area Skeptics NCAS, Maryland, D.C., Virginia. D.W. "Chip" Denman. Tel.: 301-587-3827. e-mail: ncas@ncas.org. PO Box 8428, Silver Spring, MD 20907-8428 US. http://www.ncas.org.

FLORIDA. Tampa Bay Skeptics (TBS) Tampa Bay, Florida. Gary Posner, Executive Director. Tel.: 813-849-7571; e-mail: tbs@cfiflorida.org; 5201 W. Kennedy Blvd., Suite 124, Tampa, FL 33609 US. www.tampabayskeptics.org. The James Randi Educational Foundation. James Randi, Director. Tel: (954)467-1112; e-mail jref@randi.org. 201 S.E. 12th St. (E. Davie Blvd.), Fort Lauderdale, FL 33316-1815. Web site: www.randi.org.

IOWA. Central Iowa Skeptics (CIS) Central Iowa, Rob Beeston. Tel.: 515-285-0622; e-mail: ciskeptics@hotmail.com. 5602 SW 2nd St. Des Moines, IA 50315 US. www.skepticweb.com.

ILLINOIS. Rational Examination Association of Lincoln Land (REALL) Illinois. Bob Ladendorf, Chairman. Tel.: 217-546-3475; e-mail: chairman@reall.org. PO Box 20302, Springfield, IL 62708 US. www.reall.org.

KENTUCKY. Kentucky Assn. of Science Educators and Skeptics (KASES) Kentucky. 880 Albany Road, Lexington, KY 40502. Contact Fred Bach at e-mail: fredwbach@yahoo.com; Web site www.kases.org; or (859) 276-3343.

LOUISIANA. Baton Rouge Proponents of Rational Inquiry and Scientific Methods (BR-PRISM) Louisiana. Marge Schroth. Tel.: 225-766-4747. 425 Carriage Way, Baton Rouge, LA 70808 US.

MICHIGAN. Great Lakes Skeptics (GLS) SE Michigan. Lorna J. Simmons, Contact person. Tel.: 734-525-5731; e-mail: Skeptic31@aol.com. 31710 Cowan Road, Apt. 103, Westland, MI 48185-2366 US. Tri-Cities Skeptics, Michigan. Gary Barker. Tel.: 517-799-4502; e-mail: barkerg@svol.org. 3596 Butternut St., Saginaw, MI 48604 US.

MINNESOTA. St. Kloud Extraordinary Claim Psychic Teaching Investigating Community (SKEPTIC) St. Cloud, Minnesota. Jerry Mertens. Tel.: 320-255-2138; e-mail: gmertens@stcloudstate.edu. Jerry Mertens, Psychology Department, 720 4th Ave. S, St. Cloud State University, St. Cloud, MN 56301 US.

NEVADA. Skeptics of Las Vegas, (SOLV) PO Box 531323, Henderson, NV 89053-1323. E-mail: rbanderson@skepticslv.org. Web site: www.skepticslv.org./.

NEW MEXICO. New Mexicans for Science and Reason (NMSR) New Mexico. David E. Thomas, President. Tel.: 505-869-9250; e-mail: nmsrdave@swcp.com. PO Box 1017, Peralta, NM 87042 US. www.nmsr.org.

NEW YORK. New York Area Skeptics (NYASk) metropolitan NY area. Jeff Corey, President. 18 Woodland Street, Huntington, NY 11743, Tel: (631) 427-7262 e-mail: jcorey@liu.edu, Web site: www.nyask.com. Inquiring Skeptics of Upper New York (ISUNY) Upper New York. Michael Sofka, 8 Providence St., Albany, NY 12203 US. Central New York Skeptics (CNY Skeptics) Syracuse. Lisa Goodlin, President. Tel: (315) 446-3068; e-mail: info@cnyskeptics.org, Web site: cnyskeptics.org 201 Milnor Ave., Syracuse, NY 13224 US.

NORTH CAROLINA. Carolina Skeptics North Carolina. Eric Carlson, President. Tel.: 336-758-4994; e-mail: ecarson@wfu.edu. Physics Department, Wake Forest University, Winston-Salem, NC 27109 US. www.carolinaskeptics.org.

OHIO. Central Ohioans for Rational Inquiry (CORI) Central Ohio. Charlie Hazlett, President. Tel.: 614-878-2742; e-mail: charlie@hazlett.net. PO Box 282069, Columbus OH 43228 US. South Shore Skeptics (SSS) Cleveland and counties. Jim Kutz. Tel.: 440 942-5543; e-mail: jimkutz@earthlink.net. PO Box 5083, Cleveland, OH 44101 US. www.southshoreskeptics.org/. Association for Rational Thought (ART) Cincinnati. Roy Auerbach, president. Tel: 513-731-2774, e-mail: raa@cinci.rr.com. PO Box 12896, Cincinnati, OH 45212 US. www.cincinnati skeptics.org.

OREGON. Oregonians for Science and Reason (O4SR) Oregon. Jeanine DeNoma, president. Tel.: (541) 745-5026; e-mail: wilkinsa@peak.org; 39105 Military Rd., Monmouth, OR 97361 US. Web site: www.04SR.org.

PENNSYLVANIA. Philadelphia Association for Critical Thinking (PhACT), much of Pennsylvania. Eric Krieg, President. Tel.: 215-885-2089; e-mail: eric krieg@verizon.net. By mail C/O Ray Haupt 639 W. Ellet St., Philadelphia PA 19119.

TENNESSEE. Rationalists of East Tennessee, East Tennessee. Carl Ledenbecker. Tel.: 865-982-8687; e-mail: Aletall@aol.com. 2123 Stonybrook Rd., Louisville, TN 37777 US.

TEXAS. North Texas Skeptics NTS Dallas/Ft Worth area, John Blanton, Secretary. Tel.: 972-306-3187; e-mail: skeptic@ntskeptics.org. PO Box 111794, Carrollton, TX 75011-1794 US. www.ntskeptics.org.

VIRGINIA. Science & Reason, Hampton Rds., Virginia. Lawrence Weinstein, Old Dominion Univ.-Physics Dept., Norfolk, VA 23529 US.

WASHINGTON. Society for Sensible Explanations, Western Washington. Tad Cook, Secretary. E-mail: K7RA@arrl.net. PO Box 45792, Seattle, WA 98145-0792 US. http://seattleskeptics.org.

PUERTO RICO. Sociedad De Escépticos de Puerto Rico, Luis R. Ramos, President. 2505 Parque Terra Linda, Trujillo Alto, Puerto Rico 00976. Tel: 787-396-2395; e-mail: Lramos@escepticospr.com; Web site www.escepticor.com.

International groups listings have been moved to our Web site: www.csicop.org

CENTERS FOR INQUIRY

www.centerforinquiry.net/about/centers

Transnational
3965 Rensch Road, Amherst, NY 14228
Tel.: (716) 636-4869

Austin
PO Box 202164, Austin, TX 78720-2164
Tel.: (512) 919-4115

Chicago
PO Box 7951, Chicago, IL 60680-7951
Tel.: (312) 226-0420

Indianapolis
350 Canal Walk, Suite A, Indianapolis, IN 46202
Tel.: (317) 423-0710

Michigan
3777 49th Street SE, Grand Rapids, MI 49512
Tel.: (616) 698-2342

New York City
80 Broad Street, 5th Floor, New York, NY 10004
Tel.: (212) 504-2945

San Francisco
E-mail: sf@centerforinquiry.net

Tampa
5201 West Kennedy Blvd., Suite 124, Tampa, FL 33609
Tel.: (813) 849-7571

Washington, DC
621 Pennsylvania Ave. SE, Washington, DC 20003
Tel.: (202) 546-2330

West
4773 Hollywood Blvd., Hollywood, CA. 90027
Tel.: (323) 666-9797

Argentina
Av. Santa Fe 1145 - 2do piso, (C1059ABF)
Buenos Aires, Argentina
Tel.: +54-11-4811-1858

China
China Research Institute for Science
Population, NO. 86, Xueyuan Nanlu Haidian Dist., Beijing, 100081 China
Tel.: +86-10-62170515

Egypt
44 Gol Gamal St., Agouza, Giza, Egypt

France
Dr. Henri Broch, Universite of Nice, Faculte des Sciences, Parc Valrose, 06108, Nice cedex 2, France
Tel.: +33-492-07-63-12

Germany
Kirchgasse 4, 64380 Rossdorf, Germany
Tel.: +49-6154-695023

India
A 60 Journalist colony, JubileeHills, Hyderabad-500033, India
Tel.: +91-40-23540676

London
Conway Hall, 25 Red Lion Square, London WC1R 4RL, England
E-mail: slalvani@centerforinquiry.net

Nepal
Humanist Association of Nepal, PO Box 5284, Kathmandu Nepal
Tel.: +977-1-4413-345

New Zealand
E-mail: bcooke@centerforinquiry.net

Nigeria
PO Box 25269, Mapo, Ibadan, Oyo State, Nigeria
Tel.: +234-2-2313699

Ontario
216 Beverley Street, Toronto, Ontario, M5T 1Z3, Canada
Tel.: (416) 971-5676

Peru
D. Casanova 430, Lima 14 Peru
E-mail: cipsiperu@yahoo.com

Poland
Lokal Biurowy No.8, 8 Sapiezynska Sr., 00-215, Warsaw, Poland

Russia
Dr. Valerii A. Kuvakin, 119899 Russia, Moscow, Vorobevy Gory, Moscow State University, Philosophy Department

Senegal
PO Box 15376, Dakar – Fann, Senegal
Tel.: +221-501-13-00